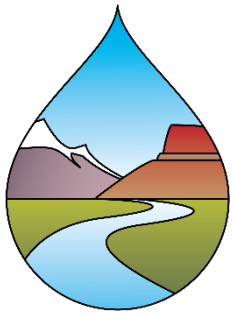
WATER REUSE IN THE WEST

Western State Water Reuse Governance and Programs



Western States Water Council
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WESTERN STATES WATER COUNCIL
STATE WATER REUSE GOVERNANCE AND PROGRAMS

INTRODUCTION

Western states have a particular interest in securing reliable supplies of water of suitable quality to meet their diverse economic and environmental needs both now and in the future. Meager precipitation west of the 100th meridian, recurring droughts, population growth, and other constraints raise concerns about water security and planning for the future. Water reuse, while not a panacea, offers opportunities to extend limited supplies of water to meet competing domestic, industrial, and ecological needs.

The development of water reuse as a solution to address water scarcity involves cooperative effort among governments, private industry, academic institutions, and water users. This report provides insights into the governance and programs at the state level for western states, and serves as an update to the Council's 2011 report titled *Water Reuse in the West: State Programs and Institutional Issues* (WSWC 2011 Report).[1]

HISTORY

The Western States Water Council (WSWC, the Council) was established by western governors in 1965 to advise them on water issues. The members of the Council are appointed by the governors. The Council's purpose is "to accomplish effective cooperation among western states in matters relating to the planning, conservation, development, management, and protection of their water resources, in order to ensure that the West has an adequate, sustainable supply of water of suitable quality to meet its diverse economic and environmental needs now and in the future."

In 2006-2008, the Council worked together with the Western Governors' Association to identify water management challenges in the West, and to recommend steps that states and federal agencies could implement to solve problems in effective and complementary ways. The organizations hosted workshops and symposia to gather input and develop their *Water Needs and Strategies for a Sustainable Future* (2006) and *Water Needs and Strategies for a Sustainable Future: Next Steps* (2008) reports. Many of those recommendations require long-term effort and are ongoing.

The 2008 report found that as traditional surface and groundwater supplies become stressed, alternative evolving technologies, including water reuse, offer opportunities for augmentation and increased efficiency. As new water supplies become scarcer, water reuse is becoming an increasingly practical and cost-effective option for meeting demands. The report recognized legal, institutional, social, financial, and technological constraints that needed to be overcome. Legal constraints to water reuse include federal and state provisions regulating content and quality of effluent and recycled water, questions about who has rights to effluent, and uncertainties about the reuse of agricultural water rights without injuring other users. Institutional or societal constraints to water reuse include educating for public acceptance of recycled water, health risks associated with reuse, potential environmental effects of water recycling, and the cost of implementing water recycling systems. Financial constraints have been addressed in some cases through state and local financial incentives, and with partnerships and economies of scale that transcend jurisdictional boundaries and simultaneously provide multiple benefits. Technological constraints include the need for coordinated research and development at all levels of government, including financial assistance toward new technology and identification of the scope and effect of emerging contaminants.

Among the recommendations on reuse, the 2008 *Water Needs and Strategies for a Sustainable Future: Next Steps* report suggested that: (1) the WSWC should explore the relative

[1] Western States Water Council (2011) *Water Reuse in the West: State Programs and Institutional Issues.* Available at www.westernstateswater.org/publications.

merits and obstacles related to various programs, technologies, and legal and institutional means to augment existing water supplies, including reuse; and (2) the WSWC should look into the differences between individual state reuse standards and consider whether or not federal treatment standards would be beneficial.

In 2010, in partial fulfillment of those recommendations, the WSWC surveyed its member states on their reuse programs and institutional issues, leading to a WSWC 2011 Water Reuse Report, *Water Reuse in the West: State Programs and Institutional Issues*. In 2020, the WSWC again surveyed its members with the intent to update changes and progress in state policies and programs over the past decade.

This report also coincides with the Environmental Protection Agency's 2020 release of the National Water Reuse Action Plan (WRAP), "a coordinated and collaborative effort across the water user community to advance consideration of water reuse to ensure the security, sustainability, and resilience of our nation's water resources."[2] Action 2.2.1 is to compile existing state policies and approaches to water reuse, including statutes, regulations, policies, programs, frameworks, and other approaches to address water reuse activities. During the development of the WRAP, "Many docket commenters, including states, affirmed the value as a beneficial resource and priority of having a searchable compilation of state policies and approaches for water reuse."[3]

Sharing information across states on how water reuse is being addressed from a legal and regulatory perspective is increasingly useful, especially as potable reuse becomes a more accepted and desired practice. In the past, water reuse conferences focused heavily on the technology that could enable this practice. Urban and rural population growth and development, as well as extreme weather and climate conditions, have necessitated the consideration of new sources of water. As the regulatory environment has built up around reuse, there has been more interest in learning how state agencies are addressing issues on the ground. This is evidenced by the development of the WRAP, as well as the inclusion of the State Summit on Water Reuse in 2019 and 2020, as part of the annual WateReuse Association's Annual WateReuse Symposium.[4] For many years, the state of Idaho hosted an annual conference on water reuse that many western states participated in, and which was eventually integrated with the larger symposium.

This report serves to provide a comprehensive look at the legal and regulatory landscape of reuse across 18 western states in 2020, as well as provide context and discussion on the opportunities and challenges states face as water reuse continues to grow. For an overview of the statutes, regulations, and guidance within a state, or for detail on the treatment requirements for different types of reuse, please refer to Appendices A & B. Survey questions are provided in Appendix C.

[2] See EPA's description at https://www.epa.gov/waterreuse/water-reuse-action-plan
[3] See Description and Background of Section 2.1 at https://www.epa.gov/waterreuse/national-water-reuse-action-plan-online-platform
[4] See https://watereuse.org/news-events/conferences/ for links to past conferences.

SUMMARY OF STATE RESPONSES

Water reuse in the West, collectively, is a relatively young but growing practice. Some states have been practicing various forms of water reuse for decades, whereas others are just starting to explore the practice on the ground. Some have robust legal and regulatory frameworks, whereas others have not yet defined reuse or water reuse practices within their statutes and rules. Regardless of where individual states are along this spectrum, most western states recognize the potential of water reuse to contribute additional water resources to meet growing urban and rural demands as the West experiences continued drought and as climate and weather patterns become increasingly variable and extreme. During the first six months of 2021, 12 of the 18 western states represented by the WSWC had at least "below average" precipitation, with five of those states categorized at "much below average." In 2020, two of those states had record dry precipitation for the year.[5]

Many states have moved or are moving beyond the basic regulatory framework for reusing water for land application and irrigation provided through National Pollutant Discharge Elimination System (NPDES) permits to developing state frameworks that include fit-for-purpose specifications and initiating discussions on how to regulate potable reuse (see Figure 1; 56% of states have specific state reuse statutes, 72% have specific state reuse regulations, and 83% have specific reuse guidance documents; see also Appendix A). Water reuse is also increasingly being built into state water planning documents and recognized as an important strategy for efficiently using existing water resources. This is highlighted by the participation of many western states in the efforts to develop and participate in the Environmental Protection Agency's (EPA) Water Reuse Action Plan (WRAP).

One notable development since the WSWC 2011 Report has been the number of states pursuing potable water reuse, both direct potable reuse (DPR) and indirect potable reuse (IPR) (see Figure 2; 56% of states have made progress on DPR or IPR at the state level). According to EPA, potable reuse refers to the process of using treated wastewater for drinking. DPR "involves the treatment and distribution of water without an environmental buffer," while IPR "uses an environmental buffer, such as a lake, river or groundwater aquifer, before the water is treated at a drinking water treatment plant."[6] While nascent, interest in potable reuse is growing, and state agencies want to be ready for it.

States committed to growing reuse in their state have made the biggest strides in this area over the past decade. For example, Texas has implemented two DPR projects, with one still in operation; Oregon has implemented one DPR project in association with a beer brewing operation; and Arizona has permitted a mobile treatment facility for demonstration purposes and public education on potable reuse. Several states are in the process of developing regulations and guidance to implement DPR, as they are anticipating it will become more popular in the coming years. However, many states have expressed that the public is still concerned about potable reuse and the idea that the water they could be drinking was recently sewage. This messaging is something that agencies are thinking about and starting to determine how to best frame the conversation and engage the public proactively.

While reuse is increasingly included in state water plans and guidance, states are also grappling with some real barriers to its growth. A major hurdle is the interaction with water rights (see Figure 2; 72% of states acknowledge water rights issues can impair development of reuse). As municipalities look to increase the efficiency of their water resources through water reuse projects, it means that not as much water may return to the waterway and once again be available to other

[5] Statewide Precipitation Ranks, January-December 2020. National Centers for Environmental Information, National Oceanic and Atmospheric Administration. https://www.ncdc.noaa.gov/temp-and-precip/us-maps/. Accessed June 15, 2021.
[6] "Potable Water Reuse and Drinking Water." United States Environmental Protection Agency. https://www.epa.gov/ground-water-and-drinking-water/potable-water-reuse-and-drinking-water, accessed December 3, 2020.

water users and the environment. Downstream users, and potentially more senior water rights holders, may have their allocations impacted if this is not addressed upfront. Some states address this by requiring projects to acquire water rights prior to applying for a water reuse permit. Others, like North Dakota, issue water rights permits that are fully consumptive and do not require wastewater to be returned to the waterway. Regardless of how state laws address water rights and reuse, most states require their water resources department or state engineer to review any water reuse project application to ensure there are no conflicting issues for existing water users. While this is one way to ensure that water reuse does not interfere with previously established water rights, it does mean that some desired projects may not be able to be developed.

Permitting water reuse projects typically falls to the state department of environmental quality, though, as mentioned, water resources departments are integral to the process as well. In some states, the state health department is also involved, especially as it relates to potable reuse projects or practices. Reuse in a majority of states is multi-jurisdictional (see Figure 1; 82% require multiple agency approvals for reuse projects), but few departments have positions dedicated to reuse (states reported 0-30 FTEs that support reuse permitting and practices). In fact, few states have a dedicated reuse program, and instead integrate it into the larger existing water permitting programs.

Water reuse projects are almost exclusively funded through the federal Clean Water State Revolving Fund (CWSRF) program (see Figure 3; 94% of states use the CWSRF to finance and fund reuse projects). Rarely do states have state or local funds to fully finance projects, which highlights the importance of federal funding in supporting the growth and development of water reuse throughout the West. In fact, some states (33%) acknowledged that increased federal financing for water reuse projects would be beneficial, and 44% mentioned that additional federal technical assistance would be helpful (Figure 3). For the past ten years, the CWSRF has included a Green Project Reserve requirement that 10% of funds go to "green" projects defined as those that increase water efficiency, energy efficiency, green infrastructure or use or develop innovative approaches. Water reuse projects fall within these guidelines, and this requirement can potentially help increase the funding available for reuse projects.

The states reported that the public is, overall, very supportive of water reuse projects, especially when they are engaged in the development of a project from the outset (see Figure 2; 67% of states said the public was supportive, while the other 33% did not mention strong public support or opposition). Many state agencies reported that the cultural ethic in local communities can affect the public's willingness to accept a reuse project, and that public outreach and engagement is a critical component to a successful water reuse program. Successful development of many reuse laws, regulations, and projects has been attributed to active stakeholder engagement processes. As agencies are exploring potable reuse, stakeholder engagement has been critical in ensuring the public's health and safety concerns are addressed in the policies and guidance documents being developed.

Some states are exploring reuse of produced waters, or water from oil and gas operations (see Figure 3; 27% of states are exploring produced water reuse). This is particularly relevant in states like New Mexico and Wyoming that have a large oil and gas sector, and are also experiencing the effects of drought. While there are concerns about the potential public health impacts from reusing produced water, investments in scientific, health and policy research are underway to explore this potential and develop a suitable regulatory framework (see individual state narratives for more details on these efforts).

Overall, water reuse is an exciting and growing practice in the West. With the momentum from EPA's WRAP and interest in potable reuse, the regulatory environment around water reuse is evolving. While potable reuse is not yet a largely accepted practice, states are preparing for this as growth and drought continue to concern western states. As seen through the state narratives, each state has a different approach relevant to the local water challenges and opportunities, which gives

rise to innovation and also highlights the importance of sharing experiences across state boundaries.

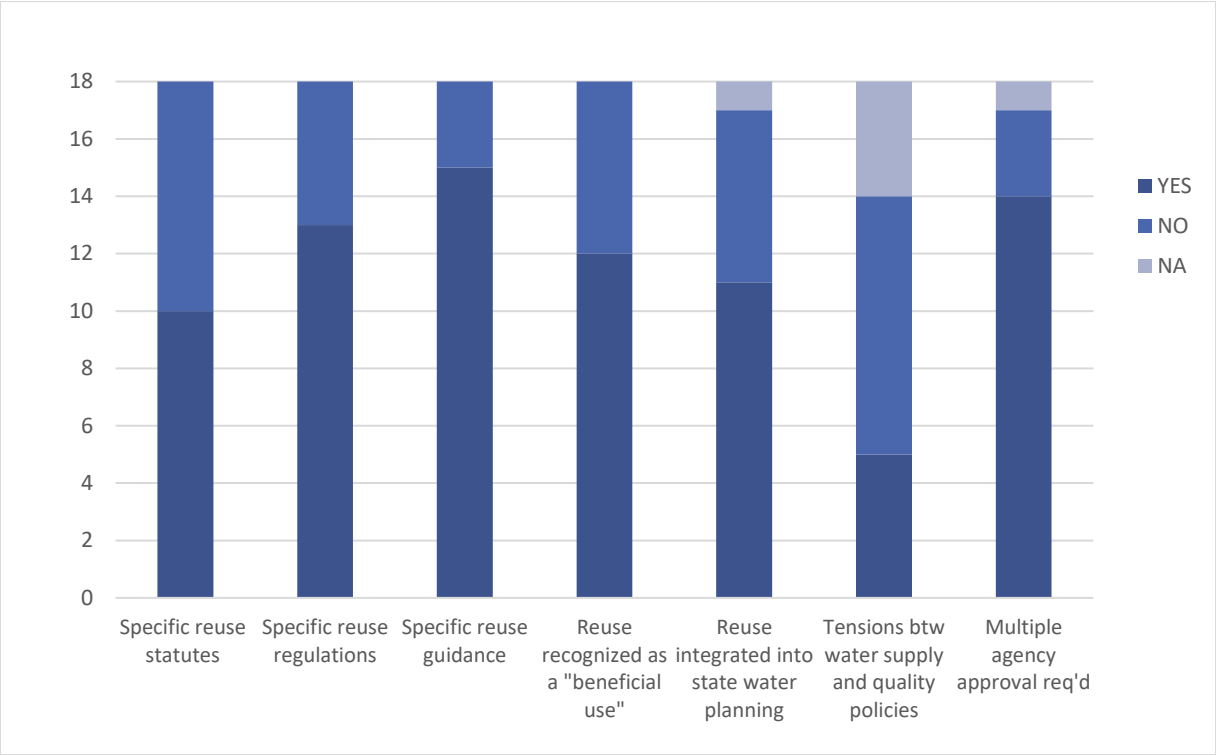


Figure 1. Number of states that answered "Yes," "No," or "Not applicable (NA)" to questions regarding state water reuse governance, policy and planning.

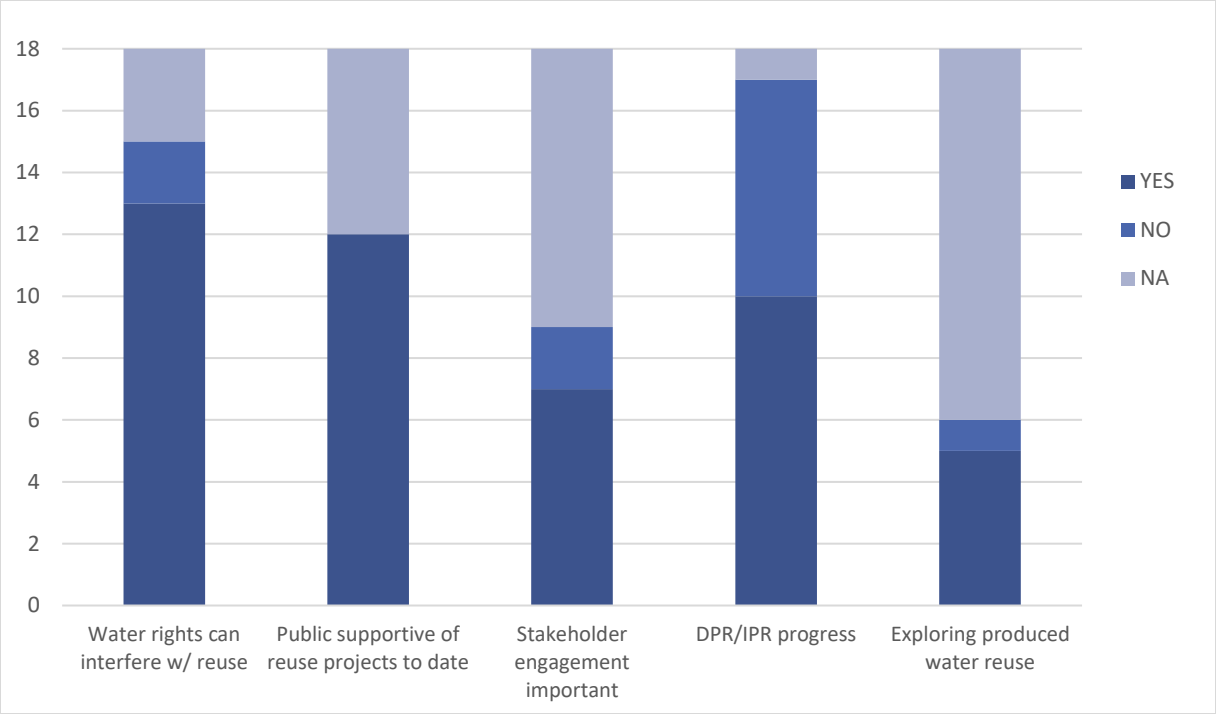


Figure 2. Number of states that answered "Yes", "No" or "Not applicable (NA)" to questions regarding opportunities and challenges surrounding the development and growth of water reuse practices in their state. DPR = Direct potable reuse, IPR = Indirect potable reuse, Produced water = wastewater from oil and gas operations.

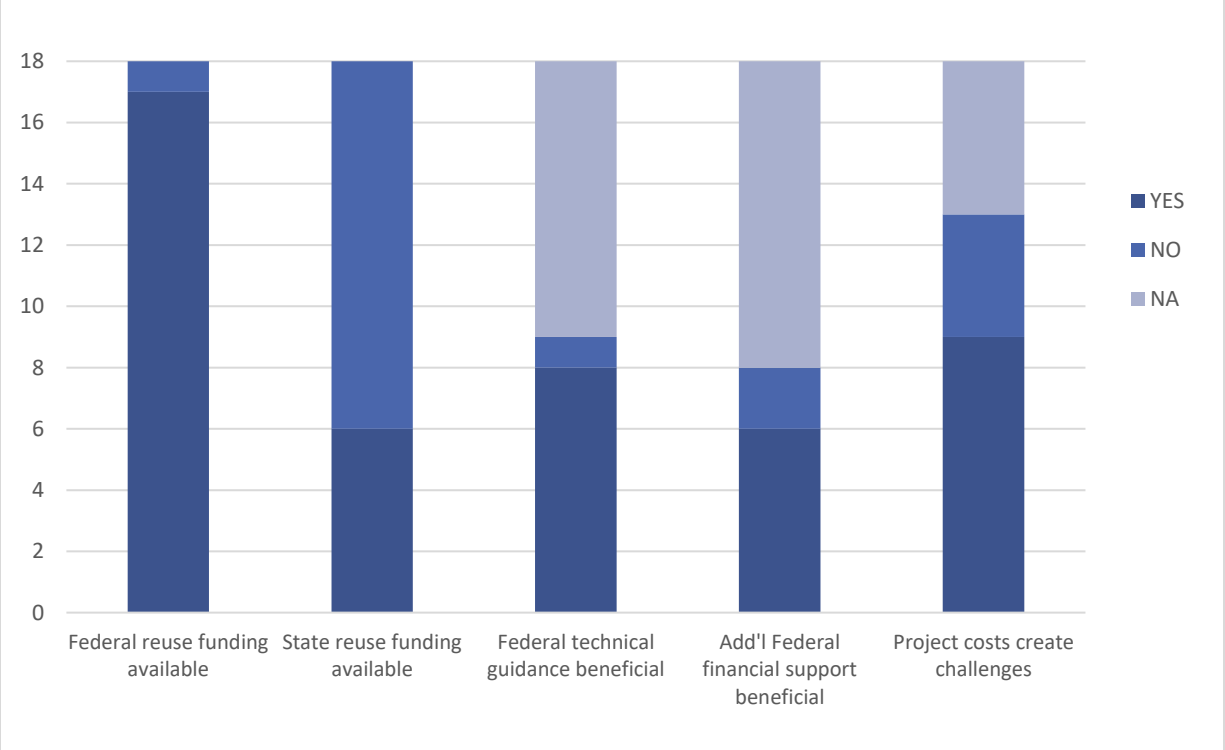


Figure 3. Number of states who answered "Yes," "No," or "Not applicable (NA)" to questions about funding and financing water reuse projects.

STATE RESPONSES

ALASKA

Alaska does not have a water reuse program, and does not currently have any plans to develop a statutory or regulatory framework for water reuse in the near future. Alaska does manage the Alaska Pollutant Discharge Elimination System that permits the release of effluent from wastewater treatment systems to surface water and groundwater, which ultimately flow back into surface waters.[7] The EPA permits discharges within Denali National Park, facilities operating outside state waters, facilities that have been issued Clean Water Act Section 301(h) waivers, and on all tribal lands.

ARIZONA

Water Reuse Governance

Arizona recognizes the importance of water reuse for their future water supply, especially as the Colorado River basin continues to experience significant drought. It is a growing practice, as evidenced by the number of facilities and the amount of water treated and stored in their aquifers. The state has also recently completed a rulemaking regarding direct potable reuse (DPR), which is a significant step in setting the stage for reused water to be a contributor to the potable water supply.

Arizona carefully manages its surface and groundwater resources. The Underground Water Storage, Savings and Replenishment (or aquifer recharge) chapter of the Water Code states the general policy and purpose is to "[p]rotect the general economy and welfare of this state by *encouraging the use of renewable water supplies*, particularly this state's entitlement to Colorado river water, instead of groundwater through a flexible and effective regulatory program for the underground storage, savings and replenishment of water..." [8] (emphasis added).

Arizona uses the term "reclaimed water," which is defined as "water that has been treated or reprocessed by a wastewater treatment plant or an onsite wastewater treatment facility."[9] "Direct reuse" is also defined as "the beneficial use of reclaimed water for specific purposes." [10] Excluded from this definition within the Arizona Administrative Code (AAC) is: "(1) the use of water subsequent to its discharge under the conditions of a National or Arizona Pollutant Discharge Elimination System (NPDES) permit; (2) the use of water subsequent to discharge under the conditions of an Aquifer Protection Permit issued under specified provisions of the AAC; (3) the use of industrial wastewater or reclaimed water, or both, in a workplace subject to a federal program that protects workers from workplace exposures; or 4) the use of potable water produced by an advanced reclaimed water treatment facility."[11]

The state also defines "effluent" as "water that has been collected in a sanitary sewer for subsequent treatment in a facility that is regulated pursuant to Arizona Revised Statutes (ARS) title 49, chapter 2 (i.e., wastewater treatment plants). Such water remains effluent until it acquires the characteristics of groundwater or surface water."[12] This is similar to the definition of reclaimed water but, unlike reclaimed water, effluent includes water that has been collected in a sanitary sewer for treatment but has not yet been treated and must be collected in a sanitary sewer prior to treatment. Uses of effluent can be recognized as a beneficial use provided it meets statutory requirements.

Aquifer Storage

Both reclaimed water and effluent can be used for aquifer storage. In 2019 the legislature amended[13] the aquifer storage requirements, reducing the amount that existing managed Underground Storage Facilities (USFs) were required to store in the aquifer from 50% to 5%. This amendment allows current

[7] Alaska Admin. Code tit. 18,§ 72
[8] Ariz. Rev. Stat. § 45-801.01
[9] Ariz. Rev. Stat. § 49-201(32)
[10] Ariz. Rev. Stat. § 49-201(10)
[11] Ariz. Admin. Code § 18-9-A701(2)
[12] Ariz. Rev. Stat. § 45-101(4)
[13] Senate Bill 1227, amending portions of Ariz. Rev. Stat. § 45-851

USFs to retain more of the effluent that they store for future recovery.

Water Rights

The Arizona Department of Water Resources (ADWR) is responsible for administering water rights. In Arizona, effluent and reclaimed water belong to the party that produced it until they acquire the characteristics of surface water or groundwater; thus, they are not subject to the same water rights limitations as surface water and groundwater. This use includes the ability to store and recover it for later use. This is different from many states, where reclaimed water must be factored into the larger prior appropriation hierarchy that can sometimes limit water reuse projects.

Through ADWR, there are currently 61 facilities between four Active Management Areas (AMAs)[14] that are permitted to store effluent. Of those, 58 are USFs and three are Groundwater Savings Facilities (GSFs).

Water Quality

The Arizona Department of Environmental Quality (ADEQ) is responsible for the water quality requirements. ADEQ regulates the water quality of reclaimed water using three components. First, under the Aquifer Protection Permit (APP) program, ADEQ sets specific treatment standards for new and expanding sewage treatment facilities, including standards for nitrogen and fecal coliform or *E. coli*. Additionally all treated effluent must meet Arizona's Aquifer Water Quality Standards, which include standards for inorganic compounds, organic compounds, and microbiological contaminants.[15] Second, to allow reuse, water produced by the wastewater treatment plant must meet reclaimed water quality standards. These reclaimed standards include both water quality standards and allowed uses, based on protection of human health, for five reclaimed water quality classes (A+, A, B+, B, and C) (see Appendix B). Each class of reclaimed water undergoes specific treatment requirements that may include standards for nitrogen, pathogens, turbidity, and enteric virus based on the water quality class and the allowed uses of the reclaimed water. Third, users of reclaimed water are regulated under reclaimed general permits, which have differing requirements depending on the water quality class that will be used at a facility.

In 2018, new rules went into effect specifically regarding direct potable reuse facilities. This process began in 2016, when ADEQ worked with stakeholders to develop proposed rule changes that would allow direct potable reuse. In April 2017, ADEQ chartered two volunteer workgroups to provide recommendations to update the water reuse rules. The first workgroup focused on recycled water quality regulations while the second workgroup reviewed issues related to recycled water infrastructure and technology. The resulting rule revision lays out the process and requirements for developing an Advanced Reclaimed Water Treatment Facility, including a pilot study, characterization of source water, reduction targets for microbial control, a monitoring plan, and an operator's training plan. Currently, the rule does not provide the parameters to be monitored or any specific water quality standards. ADEQ intends to modify the reclaimed water rules in 2021-22 to include more comprehensive and specific monitoring requirements and standards.

Through ADEQ, 166 facilities have received Aquifer Protection Permits (APPs) that regulate and allow for reuse of treated effluent. In total, these permits allow up to 764 million gallons per day of reclaimed water to be generated for either storage in aquifers or for beneficial reuse through ADEQ's reclaimed water general permits program. ADEQ has issued 620 reclaimed water general permits for beneficial direct reuse, largely for irrigation of parks, golf courses, and other green spaces.

State Programs and Funding

ADEQ has jurisdiction over the state's reclaimed water program and has statutory authority to adopt rules with standards for reclaimed water conveyances and water quality standards. It also operates a reclaimed water permit program that relies on general permits and provides individual permits for those uses that do not fit general permit requirements. ADWR regulates the water rights aspects of reclaimed water. ADEQ currently has 1 FTE that is dedicated to direct reuse of reclaimed water.

[14] In 1980, Arizona developed the Groundwater Management Code in an effort to better manage the state's finite groundwater resources. Areas that had strong reliance on groundwater were identified and designated into five regions known as Active Management Areas (AMAs). Each AMA develops and administers its own programs to meet the regulatory requirements within the Groundwater Code. See new.azwater.gov/ama.

[15] Ariz. Admin. Code §§ 18-11-401 to 408

Arizona provides financial assistance for reuse projects through the Water Infrastructure Finance Authority (WIFA), which is a state fund for water projects primarily funded through the Clean Water and Drinking Water State Revolving Funds (SRFs). The Green Clean Water criteria of WIFA are based on the EPA's Green Project reserve criteria. Projects can apply for funding if they demonstrate that at least some part of the project meets the green criteria for planning, design or construction activities. The criteria use terms like "water efficiency" and "energy efficiency" to distinguish green projects. WIFA has an incentive program for this type of project that offers up to 20% of forgivable principal, a rate subsidy, and has a Technical Assistance Program available to those who receive a loan. There is no limit on the loan amount.

Opportunities and Challenges

Due to Arizona's reliance on Colorado River water, ongoing drought may necessitate the reuse of recovered effluent. The state notes that reuse is "the only increasing renewable future [water] supply," and they have recognized there is potential to further develop reclaimed water for direct, indirect, potable and non-potable uses. To this effect, several efforts have arisen to promote and incentivize water reuse practices.

Within Arizona's AMAs, water reuse is encouraged and incentivized as part of the management plans to reduce withdrawals of groundwater. For example, under the Agricultural Conservation Program, treated effluent use is excluded from consideration in determining the amount of any debit to be registered to a farm's water flexibility account. Under the Municipal Conservation Program, treated effluent used directly from a treatment plant or stored underground and recovered within the area of impact is not counted when determining a provider's compliance with its total use (gallons per capita per day) requirement. As noted by the state, the benefits to increasing the use of reclaimed water include reserving high-quality groundwater for potable use, offsetting the use of groundwater or other renewable supplies, partially reducing land subsidence caused by over-pumping of groundwater, and recharging groundwater in areas with severe groundwater level declines. As of December 31, 2018, a total of 1,208,829 acre-feet of effluent was stored and is available for recovery within the Prescott AMA (59,149 acre-feet), Phoenix AMA (861,406 acre-feet), Pinal AMA (18,599 acre-feet), and Tucson AMA (269,675 acre-feet).

In 2018, Arizona implemented new regulations regarding DPR,[16] which were the result of multiple years of stakeholder engagement on rule development. [17] The state has concurrently been conducting significant public outreach to promote DPR. First, in 2015, Pima County's Southwest Water Campus team won the $250,000 New Arizona Prize: Water Innovation Challenge, in which they proposed to brew beer using treated reclaimed water. A mobile treatment facility used reclaimed water from three wastewater reclamation facilities located in Tucson, Phoenix, and Flagstaff. The water was purified using a multi-barrier purification process including ultra-filtration, reverse osmosis, ultraviolet disinfection with advanced oxidation, activated carbon filtration, and chlorine disinfection, then delivered to breweries to make specialty beers. ADEQ assisted in providing appropriate permitting requirements for the mobile treatment facility and outreach events.

Second, in 2019, the City of Scottsdale received a permit from ADEQ to operate the Advanced Treatment Facility to produce potable water. The water was purified using a multi-barrier purification process including ozone disinfection/oxidation, ultrafiltration, reverse osmosis, ultraviolet photolysis and stabilization, and granular activated carbon. Potable water was provided for consumption at tasting demonstrations during tours and events conducted for educational outreach at the Scottsdale Water Campus and delivered to produce water-based beverages. Scottsdale has also participated in the One Water Brewing Showcase where beer was served that was brewed using potable water produced by the local Advanced Treatment Facility.

CALIFORNIA

Water Reuse Governance

California has permitted water reuse projects for a long time, but only in recent decades has it become an approach important for maintaining water resource resilience and sustainability. As the state notes in their survey response, "Climate change will result in more frequent and more severe droughts

[16] Ariz. Admin. Code §§ 18-9-701 to 720

[17] Mosher, J.J., and G.M. Vartanian (2018). Guidance Framework for Direct Potable Reuse in Arizona. Prepared for WateReuse Arizona, AZ Water Association, and the Steering Committee for Arizona Potable Reuse, Submitted by the National Water Research Institute, Fountain Valley, CA.

and reduced snowpack, punctuated by short periods of intense precipitation, which will increase water supply challenges throughout the state. Additionally, the water infrastructure the state has developed over the last 150 years will not be suitable for the hydrology of the future, and advanced planning is critical to ensure long-term water and fiscal resilience. The use of recycled water in California is part of an integrated water management approach that includes water conservation, capture and use of stormwater, aquifer storage and recovery, and other strategies to achieve a sustainable and reliable long-term water supply."

California has an extensive regulatory and legal framework for water reuse, governed by a variety of different laws and regulations overseen by both the State and regional water boards that collectively regulate both the quality and quantity aspects of water. The California Water Code[18] encourages water reuse by stating, "the use of potable domestic water for non-potable uses, including, but not limited to, cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses, is a waste or an unreasonable use of the water...if recycled water is available." The California Code of Regulations,[19] the State Water Resource Control Board's Recycled Water Policy,[20] and the Governor's Water Resilience Portfolio[21] also encourage the use of recycled water through goals to increase the use of recycled water to 2.5 million acre-feet per year by 2030 (up from 714,000 acre-feet per year in 2015). A 2018 amendment to the Recycled Water Policy required annual reporting of monthly volumetric wastewater and recycled water data to capture the total volume and level of treatment of these sources. The first reporting date was in 2020.

The state uses the term "recycled water," defined as "water that as a result of treatment of waste is suitable for a direct beneficial use or a controlled use that would not otherwise occur, and is therefore considered a valuable resource."[22] Title 22 Division 4 of the California Code of Regulations applies only to domestic wastewater sources[23] and specifies the types of use allowed,[24] as well as applicable water quality standards for each use. These include non-potable recycled water use for surface irrigation, non-restricted recreational impoundments, industrial or commercial cooling, and other uses, as well as indirect potable reuse (IPR) for groundwater recharge and reservoir augmentation.

Other sources of reuse water in California include graywater,[25] oilfield produced water, agricultural return water, treated wastewater from non-domestic sources, and de facto or indirect reuse of treated wastewater. These are regulated through water discharge requirements (WDRs), individual water recycling requirements (WRRs), Master Reclamation permits, National Pollutant Discharge Elimination System permits (NPDES), and statewide general permits. The regional water boards determine which types of permits are applicable for a given source water, use and application site. The State also has a general permit supported by tools and templates that provides consistent regulation of non-potable water use statewide, streamlines permitting for reuse projects, and that delegates authority to the permittee to administer the distribution of recycled water to end users. The regional water boards can establish requirements to protect public health and the environment when issuing permits to industrial facilities that reuse water.

Potable Reuse

In 2017, California passed its first laws pertaining specifically to DPR.[26] It defined two different types of DPR: raw water augmentation and treated drinking water augmentation.[27] The bill also defined various DPR scenarios and required the State Water Board to adopt uniform water recycling criteria for DPR through raw water augmentation by December 1, 2023. In 2018, State Water Board staff released a Proposed Framework for Regulating Direct Potable

[18] Cal. Water Code §§ 13500-13558.1
[19] Cal. Code Regs. tit. 22, §§ 60301 et seq.; Cal. Code Regs. tit. 23, § 2920
[20] State Water Resources Control Board's Recycled Water Policy available at www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2018/121118_7_final_amendment_oal.pdf; State Water Resources Control Board Resolution No. 2018-0057, www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2018/rs2018_0057.pdf
[21] Governor's Executive Order N-10-19, Available at waterresilience.ca.gov/wp-content/uploads/2020/07/Final_California-Water-Resilience-Portfolio-2020_ADA3_v2_ay11-opt.pdf
[22] Cal. Water Code § 13050(n); Cal. Code Regs. tit. 23, § 597.2(13)
[23] Cal. Code Regs. tit. 22, § 60302
[24] Cal. Code Regs tit. 22, §§ 60303-60307
[25] Cal. Code Regs. tit. 23, §§ 491, 492.6
[26] 2017 California Assembly Bill 574; Cal. Water Code §§ 13560-13561.2
[27] Cal. Water Code § 13561 defines "Raw water augmentation," as the planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system; "Treated drinking water augmentation," means the planned placement of recycled water into the water distribution system of a public water system..

Reuse in California, which was subsequently updated in September 2019. The state "solicited feedback from stakeholders and the public in a series of public meetings, public comment periods, and board meetings in 2018 and 2019," and is currently "addressing key research and knowledge gaps discussed in the State Water Board's Report to the Legislature. The State Water Board plans to convene an expert review panel in 2021."[28]

Water Quality

The State Water Board Division of Drinking Water requires treated municipal reuse projects to submit engineering reports for project approval to describe how it will comply with the regulations. [29] The engineering report characterizes wastewater, treatment processes, uses, and the monitoring and reporting programs. Once the Division of Drinking Water approves the report, the regional water board considers the appropriate permit or if enrollment in the statewide general permit is applicable. Water quality criteria for recycled water projects include viral pathogens, potential organic contaminants and specifics depending on the use of the recycled water (fit-for-purpose specifications).

California has also implemented several regulations to ensure water quality associated with recycled water projects, including potable reuse. In 2014, they passed the Groundwater Replenishment and Recharge Regulations[30] that define requirements for potable reuse projects that augment groundwater basins used for drinking water. Similarly, in 2018, the state passed the Reservoir Water Augmentation Regulations[31] to define requirements for augmenting surface water with recycled water. Both sets of regulations include: (1) enhanced wastewater source control programs that go beyond typical pre-treatment; (2) multiple barrier treatment processes to provide pathogen reduction treatments, chemical contaminant reductions to meet primary maximum contaminant levels (MCLs), secondary MCLs, notification levels, and reductions of constituents of emerging concern (CECs); (3) water quality and treatment process monitoring; and (4) full advanced treatment including reverse osmosis and advanced oxidation processes.

The Recycled Water Policy includes a specific directive to convene a Science Advisory Panel around CECs to guide actions in the future. The first panel was convened in 2018 and reviewed non-potable and potable uses of recycled water. They recommended that monitoring for CECs in non-potable applications is not required because human exposure in these instances have low public health risk. For potable uses, they recommended that monitoring be required for: (1) health-based CECs that have toxicological relevance to human health; (2) performance indicator CECs that are used to indicate removal of broad classes of chemical during treatment; (3) surrogate parameters to measure effectiveness of treatment processes; and (4) two bioanalytical screening tools that can be used to identify unknown CECs and narrow down the types of CECs present in the water potentially dangerous to human health.

Water Rights

California recognizes recycled water as a beneficial use for the purposes of setting water quality standards under the Porter-Cologne Water Quality Control Act,[32] but reuse itself is not a beneficial use for the purpose of administering water rights. Due to the potential competition of different beneficial uses, recycled water is carefully managed to ensure that the practice does not adversely affect established water rights. If a reuse project is going to change the amount of discharge into a waterway, the developer of the project must file a wastewater change petition through the State Water Board Division of Water Rights. The Division determines whether the change will injure other users, unreasonably affect instream flows, or is contrary to the public interest. The State Water Board may also consider the cumulative impacts of a recycled water project to the environment and/or public trust resources. This is particularly relevant when discharges from a wastewater treatment plant make up the primary streamflow for a particular reach. When change petitions are filed, there is a 30-day protest period where those who may be harmed by the change can express their concerns.

[28] Available at: www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/direct_potable_reuse.html

[29] Cal. Code Regs. tit. 22, §§ 60323 – 60331

[30] Reflected in numerous subsections of Cal. Code Regs. tit. 22, §§ 60301 and 60320; DPH-14-003E Groundwater Replenishment Using Recycled Water

[31] Reflected in numerous subsections of Cal. Code Regs. tit. 22, §§ 60301, 60320, and 64668; SBDDW-16-02 Surface Water Augmentation Using Recycled Water

[32] Cal. Water Code §§ 13000 et seq.

State Programs and Funding

The responsibility for implementing reuse programs is spread across several different state agencies. These include multiple divisions within the State Water Board, including the Division of Drinking Water, Division of Water Quality, Division of Water Rights, Division of Financial Assistance, Office of Research, Planning and Performance, and the Office of Enforcement. Other agencies include the regional water boards, California Department of Water Resources, California Department of Food and Agriculture, California Department of Fish and Wildlife, and the California Public Utilities Commission. The state estimates around a total of 30 FTEs across all agencies, but typically one position is not fully dedicated to reuse and is instead a smaller part of many employees' portfolios.

The state also has dedicated funding for water reuse through the State Water Board's Water Recycling Funding Program (WRFP). This fund provides grants and loans for technical and financial assistance to other agencies and stakeholders to support research, project planning, design, and construction. State funding sources for the WRFP include California's Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (Proposition 13);[33] the Water Quality, Supply, and Infrastructure Act of 2014 (Proposition 1);[34] the California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018 (Proposition 68); [35] and the state Clean Water SRF program. Typically, projects are assessed on a "readiness to proceed" basis, meaning they need to be ready to implement. Funding varies from year to year, but amounts range from $5 to $50 million for grants, or $150 million for loans. Funding applications must follow the WRFP-established guidelines, [36] and if applicable, the CWSRF Policy.[37] CWSRF Intended Use Plan describes the available funding for the upcoming state fiscal year.[38]

Opportunities and Challenges

California has prioritized water reuse within state planning and funding processes for decades. It is integrated into the California Water Plan as a critical component of a sustainable future and a diversified water supply portfolio. The Governor's Water Resilience Portfolio supports reuse, and the many bonds that the people of California have passed in recent years have invested significant funds into recycled water research, planning, and construction.

Groundwater management and storage have become important issues in water resource planning. In 2014, the legislature passed the Sustainable Groundwater Management Act (SGMA)[39] that requires water and land-use agencies to form groundwater sustainability agencies, which are then responsible for developing groundwater sustainability plans. Recycled water may be used to recharge groundwater, often in the form of Aquifer Storage and Recovery (ASR) projects or Managed Aquifer Recharge (MAR) projects, and these approaches may be integrated into the sustainability plans. The state notes that "groundwater basins in California can contain levels of salt and nutrients that threaten to exceed water quality objectives established in the applicable regional water board water quality control plans (basin plans)," but basin plans do not always include adequate procedures for ensuring compliance. These potential exceedances can be caused naturally or by agricultural, domestic, industrial or municipal wastewater. The Recycled Water Policy recommends that the most efficient way to address these water quality issues is to develop a regional or subregional salt and nutrient management plan (SNMP)[40] rather than imposing individual requirements on specific projects. These SNMPs can be integrated into the groundwater sustainability plans that are in development, though the two plans exist within different statutory frameworks and that may create challenges moving forward.

[33] Assembly Bill No. 1584 (2000). Available at www.waterboards.ca.gov/water_issues/programs/grants_loans/propositions/prop13.shtml

[34] Assembly Bill No. 1471 (2014). Available at leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1471

[35] Senate Bill 5 (2018). Available at leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB5

[36] Available at: www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling

[37] Available at: www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/index.html

[38] Id.

[39] Cal. Water Code § 10720 et seq.

[40] For an example of an approved salt and nutrient management plan, see the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) webpage: www.cvsalinity.org/ and associated regional water board webpage: www.waterboards.ca.gov/centralvalley/water_issues/salinity/

California has experienced some tension between their water supply and water quality policies related to recycled water with respect to per- and polyfluoroalkyl substances (PFAS). The State Water Board issued orders in July 2020 to 250 publicly owned treatment works facilities to better understand PFAS prevalence in water coming into and leaving the plants, and the relationship between concentrations and treatment levels. While the investigation of PFAS is in early stages, the data will be used to inform if changes to water treatment is necessary to protect public health. This is also a concern for groundwater resources, as PFAS is likely prevalent in many waters used for recharge. The state is still figuring out how to reduce this risk and notes, "As California increases its investment in alternative water supplies to respond to climate change and population increase, we will increasingly need to address these conflicts between available water, convenient storage, and water quality concerns."

Regarding public support of water reuse in the state, California attributes the overwhelming acceptance of and confidence in reuse to a long-time permitting program, strict public health standards based on conservative risk assessments, and the state's open, transparent, and strict regulatory standards. This includes monitoring requirements within the Recycled Water Policy for CECs and the Science Advisory Panel on CECs that help to increase public confidence that unknown CECs are being addressed.

The state also recognizes the importance of public outreach and education as a key element for success and will continue to invest resources to promote the safety and reliability of recycled water supplies. However, these programs can be some of the first to be cut during economic downturns despite their requisite presence for success.

COLORADO

Water Reuse Governance

Colorado has had a long-standing interest in water reuse, beginning with projects in Colorado Springs and Aurora in the 1960s. In 2015, the state developed the Colorado Water Plan, [41] which explicitly integrates water conservation and reuse into its long-term strategy. However, there are factors that influence the implementation of water reuse, such as public acceptance of DPR, cost to treat lower-quality water sources, infrastructure capacities, regulatory requirements, and the issue of reduced return flow that could affect downstream users, among others. Most of Colorado's reuse has been for non-potable reuse, though "de facto" potable reuse occurs when treated water is discharged to a waterway that supplies a downstream community. Currently, there are 27 entities in Colorado that treat wastewater and produce non-potable recycled water.

The Colorado Water Quality Control Act[42] considers water reuse to be a beneficial use. However, Colorado notes that water rights issues essentially preclude significant water reuse in much of the state.

Water Quality

Colorado defines two classes of water that each have their own set of regulations - "reclaimed water" and "graywater." The Water Quality Control Division (WQCD) of the Colorado Department of Public Health and Environment (CDPHE) is responsible for ensuring implementation of the laws and regulations governing water reuse to protect public health, the environment, and water quality. As with other states, science-based water quality standards and federal and state regulations ensure this water is treated to a safe standard, regulated through discharge permits.

Reclaimed water is defined as "domestic wastewater that has received secondary treatment by a domestic wastewater treatment works (centralized system or a localized system) and such additional treatment as to enable the wastewater to meet the standards for approved uses." [43] Approved uses include specific applications within industrial uses, landscape irrigation, agricultural irrigation, commercial uses, fire protection, and toilet and urinal flushing.[44]

Graywater is defined as "that portion of wastewater that, before being treated or combined with other wastewater, is collected from fixtures within residential, commercial, or industrial buildings or institutional facilities for the purpose of being put to beneficial uses. Sources of graywater are limited to discharges from bathroom and laundry room sinks, bathtubs, showers, and laundry machines. Graywater does not include the wastewater from toilets, urinals,

[41] Available at cwcb.colorado.gov/colorado-water-plan
[42] Colo. Rev. Stat. § 25-8-101 to 803
[43] 5 Colo. Code Regs. § 1002-84.5
[44] 5 Colo. Code Regs. § 1002-84.9

kitchen sinks, dishwashers, or non-laundry utility sinks."[45]

Rainwater is allowed to be reused but is unregulated for water quality purposes. Currently, residences can collect up to 110 gallons of rainwater to be used for outdoor irrigation.[46]

Potential Future Potable Reuse

Colorado is considering DPR , and WQCD has worked with a panel of water reuse experts to develop a regulatory framework. Stemming from this effort is a publication called Guidelines for Direct Potable Reuse in Colorado (December 2019)[47] that will help inform the stakeholder process to develop rules for DPR in Colorado's Primary Drinking Water Regulations (Regulation 11). [48] The stakeholder process began in March 2021 and a rulemaking is tentatively planned for 2023.

Water Rights

Water rights are governed by the Water Rights Determination Act of 1969,[49] which created a system of water divisions based on watershed drainages across the state. Each division is staffed by appointees of the State Engineer and State Supreme Court, who are responsible for the determination of water rights, the use and administration of water, and all other water matters within the division. The water courts define water rights through decrees, and no reuse is allowed unless their decree explicitly provides for that use.

The state allows various sources of water to be used to extinction, including transbasin diversions, agricultural-municipal water transfers, and non-tributary groundwater, as long as there is no injury to downstream water rights. Water reuse that is confined to a building is not considered an injury to water rights, and therefore can be recycled regardless of whether it leaves its basin of origin.

State Programs and Funding

The WQCD is responsible for implementing Regulation 84, [50] which includes jurisdiction over reclaimed water treatment and water quality, how reclaimed water is used, and enforcement. As described in the WSWC 2011 Report, Colorado reuse projects operate through a system of "notices of authorization" (NOAs) that set the conditions, requirements, and types of reuse allowed for the project. Once an NOA is issued, reclaimed water treaters have jurisdiction to ensure that their users properly adhere to their NOA and any requirements of Regulation 84, including authority to shut-off service if they identify violations. Upon request from the reclaimed water treater, WQCD can modify, revoke, reissue and terminate NOAs. The WQCD employs two FTEs specific to reuse permitting and compliance.

Regulation 86, [51] which regulates graywater reuse, provides local cities and counties the ability to opt-in to a voluntary program that allows them to regulate their own graywater projects. The local governments must develop their own ordinances and adopt requirements at least as stringent as state regulations; once this occurs, they have primary enforcement authority. The WQCD can enforce action upon a local city or county if graywater reuse is occurring without a local graywater control program, or if the program does not meet state requirements.

Funding for reuse projects is available through the Clean Water SRF in the form of grants and loans for the design and construction of Colorado water and water pollution control infrastructure. In addition, the Colorado Water Conservation Board provides access to funds through several loan and grant programs and is also exploring new funding strategies for water conservation, such as developing a tax-credit program for certain activities. The 2015 Colorado Water Plan states, "The CDPHE is committed to working with stakeholders to ensure that health and environment are protected while water reuse expands -- but the CDPHE needs additional funding to support expanding safe and environmentally friendly water reuse. Without the ability to expand reuse, the gains that are forecasted to foster permanent growth in the reuse of limited water supplies may not be realistic."

Opportunities and Challenges

Colorado noted several opportunities and challenges associated with developing water reuse in the state. Overall, the public has not expressed much fear in water reuse, though it has to-date largely focused on non-potable applications. Awareness of limited

[45] 5 Colo. Code Regs. § 1002-86.8
[46] Colo. Rev. Stat. §§ 36-96.5-101 to 105
[47] Available at cwcb.colorado.gov/reuse
[48] 5 Colo. Code Regs. § 1002-11
[49] Colo. Rev. Stat. §§ 37-92-101 to 602 (2019)
[50] 5 Colo. Code Regs. § 1002-84
[51] 5 Colo. Code Regs. § 1002-86

water resources due to drought, population growth, and changes in climate can potentially lead to a "conservation culture" that breeds support for water efficiency efforts such as reuse. Colorado recently adopted the use of reclaimed water to irrigate community gardens, including those at schools. Local organizations and schools intend to use these gardens to educate students about water conservation and non-potable reuse, which can help to develop that culture.

The state is aware that as interest in potable reuse increases and projects are implemented, there will be a need for CDPHE to be involved in public education efforts to address any negative perceptions about potable reclaimed water use and to help to boost public acceptance of the practice. Environmental justice concerns around potable reuse have been raised elsewhere in the past and could arise in Colorado as well.

CDPHE has taken an inclusive approach to reuse policy development by conducting robust stakeholder engagement processes that represent many sectors of the public. For example, when crafting Regulation 84, stakeholders brought many of the approved reclaimed water uses to CDPHE, and the agency worked with them to develop rules that were protective of public health and the environment. CDPHE also has education, training, and signage requirements as part of their NOA conditions.

Even with overall support for water reuse, Colorado has experienced several incidents with reuse projects that have negatively impacted the environment and raised concerns around the practice. For example, one water utility experienced algae blooms in several of their impoundments. Stakeholders have raised concerns about the impact of reuse on downstream water quality, groundwater, and particularly impacts to the agricultural sector. Recycling municipal wastewater impacts total dissolved solids (TDS) concentration in effluent; high TDS can be detrimental to certain crops, thus impacting yield and revenue for downstream farmers.

CDPHE is also concerned with non-potable reuse applications that involve close human contact, specifically pathogen growth in the distribution system and related health risks. Reclaimed water treaters are required to meet certain water quality standards at the point of compliance, which is directly after treatment and prior to storage and distribution. Storage in impoundments can create high potential for pathogen regrowth in water that is then delivered to communities. They note that developing regulatory monitoring requirements using surrogate organisms closer to the point-of-use could be helpful.

IDAHO

Water Reuse Governance

Water reuse is well-developed in Idaho, as evidenced by the 141 active, successful projects currently in operation and dedication of 12.5 FTEs within the Idaho Department of Environmental Quality (IDEQ) to water reuse permitting and compliance. Idaho has been permitting reuse projects since 1989. The state partially attributes this success to a robust stakeholder engagement process during the permitting phase by both IDEQ and municipalities where questions and concerns are addressed, as well as an overhaul of the regulatory code in 2010 that streamlined the rules and made implementation more efficient.

Recycled Water Rules

Idaho defines water reuse as, "The use of recycled water for irrigation, ground water recharge, landscape impoundments, toilet flushing in commercial buildings, dust control, and other uses." Recycled water specifically refers to water treated by a wastewater system and used in accordance with the Recycled Water Rules,[52] which regulate water reuse. While most reuse is for non-potable purposes, one potable reuse permit has been issued in the state.

The Recycled Water Rules are enforced through the issuance of reuse permits that specify the allowable uses for each project. If a use is requested that is not specified in the regulations, the use is evaluated on a site-specific, case-by-case basis. Ultimately, Idaho's regulations allow for broad reuse application. As stated in the Recycled Water Rules, "It is the policy of the Department to promote, where appropriate, the practice of reuse of both municipal and industrial recycled water through the continued creation and implementation of rules and guidance that give permittees various opportunities for new forms of reuse."[53]

[52] Idaho Admin. Code r. 58.01.17

[53] Idaho Admin. Code r. 58.01.17.100-03

Permit Exempt Reuse

Idaho allows wastewater from livestock truck washing facilities,[54] feedlots, dairies, and mining to be reused, but these activities are excluded from permit requirements under the Recycled Water Rules. Other state rules regulate these practices. Municipalities looking to use recycled water for irrigation purposes at wastewater facilities are also exempt from the Recycled Water Rules if there are no other applications of the recycled water, the facility has an NPDES permit, and the public is limited from interaction with the treatment area.

Water Quality

IDEQ is responsible for overseeing all municipal and industrial reuse. The Recycled Water Rules specify different classes of recycled water, from Class A to Class E. Each class has different treatment and disinfection standards that enable different beneficial uses. For pathogens, Idaho follows California Title 22[55] standards for disinfection. The regulations also require compliance with the Ground Water Quality Rule [56] to ensure protection of groundwater resources. Industrial recycled water is evaluated on a case-by-case basis. Unregulated contaminants are not evaluated.

Water Rights

Use of recycled water from a water rights perspective is overseen by the Idaho Department of Water Resources (IDWR). Idaho water rights law and case law has addressed the use of recaptured and reused wastewater for both individuals and municipalities, which are subject to somewhat different regulations. For individuals, water can be recaptured and used as long as the treated land area is not enlarged by application of the recaptured water. In other words, if an appropriator can use their diversion more efficiently on the same lands as the original appropriation, then they are allowed to do so regardless of downstream water users that may have come to rely on the wastewater or return flow. As stated in the 2020 Idaho Water Law Handbook (IWLH), which describes the basic principles of Idaho's water law system, "If additional lands or other uses are to be added to a water right through the recapture of wastewater, a new water right will be necessary."[57]

Municipalities are allowed to "recapture and reuse effluent from its sewage treatment plant before it is released to a public water body." [58] In addition, municipalities are not subject to a fixed place of use; rather, they can expand that application as the service area grows over time. IDWR considers municipal water rights to be 100% consumptive, thus any recapture or reuse activity is not deemed to be an enlargement of the water right, which is illegal under state law. IWLH states that, "While Idaho courts have not yet had occasion to address the issue, other state courts have consistently upheld the right of municipal providers to recapture and reuse municipal effluent and even, in some cases, to sell it to others."[59] The IWLH notes this has been confirmed in informal guidance from IDWR.

State Programs and Funding

As stated above, the state employs 12.5 FTEs for implementation of reuse programs.

Funding for water reuse is available through both the Clean Water SRF and state planning grants. State planning grants will cover 50% of the costs of the facility planning study and environmental report, while SRF funds will fully fund reuse projects. IDEQ has also revised their project review process to give additional points to reuse projects.[60] While there are some funds for reuse locally, the state noted that communities would benefit from more financial support for existing wastewater treatment system upgrades related to water reuse. Systems looking to develop a new reuse project would benefit from funding for all stages of the project development process, including facility planning, treatment, use, and community outreach.

Opportunities and Challenges

IDEQ has been involved with water reuse for 31 years and has been a leader in the field. They have worked closely with other states on development of water reuse rules, including with California to adopt legislation identical to California's Title 22 reuse criteria. IDEQ has also worked with EPA on the 2012

[54] Idaho Admin. Code r. 02.04.23
[55] See, e.g,, Cal. Code Regs. tit, 22 §§ 60320.108 and .208
[56] Idaho Admin. Core r. 58.01.11
[57] Fereday, Jeffrey C., Christopher H. Meyer, and Michael C. Creamer. 2020. Idaho Water Law Handbook: The Acquisition, Use, Transfer, Administration and Management of Water Rights in Idaho. See p201.
[58] Id. at p202.
[59] Id. at p203.
[60] See, e.g., SRF project rating forms at www.deq.idaho.gov/water-quality/grants-and-loans/construction-loans/

EPA Guidelines for Water Reuse and provided feedback on the recent EPA Water Reuse Action Plan. Regionally, IDEQ helped to initiate the Pacific Northwest Chapter of the WateReuse Association and began partnering with them to host a bi-annual Water Reuse Conference. IDEQ previously hosted an annual reuse conference, beginning in 2004, to provide a forum for all stakeholders to discuss issues around the practice.

While IDEQ has been actively involved in reuse development, it is not explicitly mentioned as a strategy within the Idaho State Water Plan adopted in 2012. However, in 2016, Governor Butch Otter requested the development and addition of a Sustainability Section to the Water Plan that addresses the need for stewardship of Idaho's water resources. It states, "Stewardship of Idaho's water resources begins with the realization that the water resources of the state are not inexhaustible. Therefore, it is necessary to manage and administer Idaho's water resources and protect Idaho's water quality. Stewardship, by necessity, also includes taking affirmative steps to address declining trends in the resource, where those trends exist, and to establish policies that will prevent future unsustainable declines. The goal must be overall stewardship of the state's water resources for the good of the people of the State of Idaho."[61]

IDEQ notes that communities that embrace sustainability and the "One Water" paradigm[62] often encourage reuse. Stricter permit limits on NPDES and Idaho PDES permits are also encouraging water supply systems to consider reuse, and IDEQ funding through state loans and grants helps to offset this cost.

Some of the greatest obstacles for increased implementation of reuse projects include (1) the lack of public understanding of the capabilities of wastewater treatment, as well as (2) the economics of the treatment facilities associated with operations and management. The public is generally concerned with changes to fee structures that may be required to support treatment, as well as concerns with the resulting water quality after treatment. Land prices and the costs of facility upgrades could inhibit water reuse for some locations. Lack of qualified operators and the low pay structure for operators may also inhibit reuse development.

KANSAS

Water Reuse Governance

Kansas has a growing interest in water reuse. Historically, reclaimed water has been encouraged and supported, and is commonly used for irrigation with some industrial use. The 2015 Kansas Water Vision[63] highlighted reuse as an important strategy for ensuring additional sources of water supply for Kansas going forward. The Kansas Health Institute has championed an initiative to look at policy considerations that would foster increased water reuse.[64]

Kansas does not formally recognize "water reuse" or a similar term in its statutes or regulations, but there are multiple references that allude to water reuse as a beneficial use. For example, the Kansas Water Appropriation Act recognizes water reuse as a beneficial use under an all-encompassing reference to "all water" [65] and not using fresh water for a proposed use if "other waters" [66] are available. Additionally, the definition of "waste of water" within the regulatory code "means any act or omission that causes…(1) The diversion or withdrawal of water from a source of supply that is *not used or reapplied* to a beneficial use on or in connection with the place of use authorized by a vested right, an appropriation right, or an approval of application for a permit to appropriate water for beneficial use…"[67] (emphasis added). Finally, groundwater regulations also state that, "In any case where it is not technologically and economically feasible to utilize *poorer quality water* for the development of underground storage in mineralized formations and fresh water must be

[61] Idaho State Water Plan Sustainability Section. Adopted November 2, 2016. Available at idwr.idaho.gov/IWRB/water-planning/state-water-plan.html

[62] "One Water" is a management approach based on integrated water resources management where the central idea is that "all water has value and should be managed in a sustainable, inclusive, integrated way." (US Water Alliance (2016) One Water Roadmap: The Sustainable Management of Life's Most Precious Resource. Available at www.uswateralliance.org/one-water).

[63] Kansas Water Vision, available at kwo.ks.gov/water-vision-water-plan/water-vision. In 2013, former Kansas Governor Sam Brownback called for the development of a 50-year vision for Kansas water resources, recognizing that the state economy will not be able to grow without continued planning and action. The Kansas Water Vision was developed in response, with action items subsequently incorporated into the Kansas Water Plan to formalize the vision.

[64] Kansas Health Institute. Potential Health Effects of Municipal Water Reuse in Kansas: Kansas Health Impact Assessment Project. 2017. Report number KHI/17-30. Available at: www.khi.org/policy/article/WaterHIA.

[65] Kan. Stat. Ann. § 82a-702

[66] Kan. Stat. Ann. § 82a-711(a)

[67] Kan. Admin. Regs. § 5-1-1(kkkk)

used, the chief engineer shall require the construction of surface brine storage facilities...." [68] (emphasis added).

All reuse waters are slated for non-potable purposes, either irrigation or industrial processing. As the state noted in their survey response, municipal wastewater may be reused for irrigation of crops and vegetation not intended for direct human consumption. Indirect reuse occurs through agricultural return flows from irrigated lands that supply water for downstream water rights. Industrial reuse is not common in Kansas, but when it does occur the industrial users tend to receive wastewater for reuse rather than produce it. Produced waters from the oil and gas industry continue to be a "vexing issue" due to the high levels of dissolved solids.

Water Quality

The water quality of reused wastewater is of concern, but no there are no specific laws addressing this issue. Generally, NPDES permits require some monitoring and testing for bacteria content or other contaminants unique to the user. The state notes that disinfection and monitoring of wastewater is typically required by the permits prior to reuse.

Potential Future Potable Reuse

Kansas has not yet considered potable reuse and is waiting until the demographics and costs are "more favorable" to consider it as an option. However, they are tracking developments from EPA's WRAP and are watching other states, including Idaho and Oklahoma, for approaches to reuse to consider, specifically in regards to wastewater and produced waters from oil and gas operations.

Water Rights

Kansas does not allow water reuse to increase the net consumptive use of a water right once a vested right has been determined or the time expires to perfect a water right. This is to ensure that downstream water rights are not impacted, though the state previously noted that "they would not knowingly approve a new application that would be primarily dependent upon 'return flows' from another source or user unless conditioned upon availability of return flows." [69] Municipal use is presumed to be fully consumptive, and any water released back into the system is available for appropriation. If a city begins to reuse water that they previously returned and a downstream water right is subsequently impaired, the prior appropriation doctrine is applied. As cities look to new approaches to secure water supplies to allow growth and mitigate the impacts of drought, this policy could potentially impact their ability to implement reuse for additional supplies.

State Programs and Funding

Pursuant to the Governor's 2015 Water Vision, the Kansas Water Office oversees planning, demonstration, and research efforts for water reuse. When it comes to reuse implementation, the Kansas Department of Water Resources (KDWR) oversees the water use aspect through their permitting process, and the Kansas Department of Health and Environment (KDHE) oversees the public health aspect. Most permitting staff of both agencies "dabble" in reuse through the conditions placed on individual permits and water rights. However, as long as reuse remains within the authorized place of use, meaning that the water does not re-enter the natural waterway prior to reuse, no additional permit is required from KDWR for reuse activity.

Kansas does not have a dedicated source of state funding for water reuse and does not mention the use of SRF funds for these purposes.

Opportunities and Challenges

With the Governor's 2015 Water Vision, there has been an interest in better understanding how reuse can be a part of the toolbox for securing water supplies in the face of growth and changing environmental conditions. The Vision calls for several research activities, including identifying all potential barriers to allowing the use of "lower quality waters,"[70] reviewing state and local laws and policies that could affect agricultural, industrial and municipal reuse, understanding how agricultural practices affect the ability and amount of water available to reuse, understanding best treatment technologies for various beneficial uses, and ensuring that current incentives include the ability to adopt reuse technologies.

[68] Kan. Admin. Regs. § 50305(b)

[69] Western States Water Council (2011) *Water Reuse in the West: State Programs and Institutional Issues.* Available at www.westernstateswater.org/publications.

[70] Lower quality waters include treated wastewater effluent, grey water, stormwater runoff, oil and gas flow back and produced water, brackish surface and groundwater, and other waters with elevated levels of contaminants. (2015 Water Vision)

While there are high-level efforts to better integrate reuse into the larger water strategy, the state notes that the demographics of Kansas and costs associated with reuse have stalled implementation on the ground. Additionally, general water quality concerns exist when developing and implementing a wastewater reuse program, though these concerns are generally resolved through the permitting process. Kansas also mentioned that salt accumulation has been an issue, as experienced in the Arkansas River following irrigation use in Colorado.[71] As water is reused for irrigation, salt can become more concentrated in the effluent. As agricultural return flows enter the natural waterway, higher salt concentrations can affect downstream uses.

Overall, water reuse in Kansas has mostly been implemented at the local level to reuse wastewater instead of discharging it. To date, there are 140 municipal facilities serving small populations that are permitted to use wastewater for irrigation. This could change in the future, but there are barriers that need to be addressed and educational efforts that need to happen to make additional forward progress.

MONTANA

Water Reuse Governance

The Montana Department of Environmental Quality (MDEQ) and Montana Department of Natural Resources and Conservation (MDNRC) are the two agencies that regulate water reuse in the state. Prior to 2011, Montana state law only allowed for agricultural reuse below the agronomic uptake rate on a case-by-case basis. [72] The 2011 legislature authorized MDEQ to develop effluent reuse rules and standards and expanded the approval for types of water reuse. This bill defined reclaimed wastewater in statute, and allowed for groundwater permit exemptions for specific reuse scenarios.[73]

Montana defines reclaimed wastewater as "wastewater that is treated by a public sewage system for reuse for private, public, or commercial purposes." [74] Reuse is defined as "the practice of placing reclaimed wastewater into service in a manner appropriate with the level of treatment."[75]

The last major change to Montana's water reuse policies was in 2012, with an update to Circular DEQ-2: Design Standards for Public Sewage Systems (DEQ-2). This update established treatment requirements for reclaimed water based on intended use and distinguished between application above and below agronomic uptake rates. Since most reclaimed water in Montana is used for irrigation, unique standards were established for reclaimed water used for this specific application, including the requirement of buffer zones and nutrient management plans. Montana does not allow for the direct application of reclaimed water to surface water or direct potable reuse of reclaimed water. All indirect potable water reuse applications, such as aquifer recharge and aquifer injection, are required to meet either nondegradation or primary drinking water standards.[76]

Water Rights

Montana does not define water reuse as a beneficial use. A proposed reuse project must first obtain necessary water rights approvals from MDNRC. [77] MDNRC evaluates proposed wastewater reclamation projects on a case-by-case basis to determine whether reuse would require a change of appropriation of the water right.

Water Quality

After the MDNRC approval process, MDEQ reviews the plans and specifications. If the reuse facility discharges to a water of the state, then the applicant must obtain a Montana PDES permit.

There are over 50 facilities that are permitted to use reclaimed water in Montana, mostly for spray irrigation.

State Programs and Funding

There are currently no full-time employees (FTEs) who focus on reuse, but staff in several divisions of MDEQ and MDNRC have some expertise in the subject. There are no funds specifically set aside for

[71] Western States Water Council (2011) *Water Reuse in the West: State Programs and Institutional Issues.* Available at www.westernstateswater.org/publications.
[72] Montana House Bill 52 Fact Sheet
[73] House Bill 52 (2011) amended Mont. Code Ann. §§ 75-6-102 and -103
[74] Mont. Code Ann. § 17-30-1001(14)
[75] Circular DEQ-2: Design Standards for Public Sewage Systems
[76] Id.
[77] Mont. Code Ann. § 85-2-101 et seq.

water reuse in Montana, though facilities may apply for a Clean Water SRF loan in order to implement a reuse system.

Opportunities and Challenges

Montana still faces many challenges regarding water reuse. Montana has established stringent treatment standards for water reuse which protect human health and the environment. Processes such as disinfection, settling, and oxidation are required for almost all types of reuse. This adds considerable cost to the reclamation process and can dissuade facilities from incorporating reuse into their program. Additionally, reclaimed wastewater may only be employed for approved uses specified in DEQ-2.[78] Changing regulations, like DEQ-2, to add new uses requires a difficult formal rulemaking process. This stifles the potential for creativity around implementing reuse projects. Since water reuse is not considered a beneficial use in Montana, the case-by-case evaluation approach creates uncertainty and effectively disincentivizes reuse projects. When considering these projects, water rights are a focal point of discussions, and makes reclamation projects unlikely in basins where water rights are fully appropriated. The 2015 State Water Plan failed to discuss the potential for increased water reuse despite anticipated increased stress on Montana's water resources. The state has the opportunity to leverage the policies in place to encourage reuse and work through current barriers to greater participation.

NEBRASKA

Water Reuse Governance

Little has changed over the past decade regarding water reuse in Nebraska. The state does not have a statutory term defining reuse, but does allow treated wastewater from wastewater treatment facilities to be land applied for irrigation. This is regulated through NPDES permits, which the Nebraska Department of Environmental Quality (NDEQ) issues.[79]

Land-Applied Wastewater

Both industrial and domestic wastewater can be land-applied for irrigation but have different permitting requirements. An NPDES permit is always required for the land-application of industrial wastewater. [80] Domestic wastewater facilities can obtain a permit to apply effluent, single-pass noncontact cooling water, or biosolids through Authorization by Rule.[81] Domestic facilities do not require an NPDES permit as long as all requirements, conditions, limitations, and prohibitions laid out in the NPDES regulations are met. If the facility cannot meet all of the specified criteria in the rule, they can apply for a Site-Specific Land Application Authorization.[82] NDEQ will determine on a case-by-case basis the conditions of the permit to ensure that public and environmental health are maintained. Municipal treatment plant effluent reuse is encouraged.

The state notes in their survey response that water reuse through the NPDES permit system can come into conflict with other regulatory agencies, such as Nebraska Game and Parks Commission, Fish and Wildlife Service, or Natural Resource Conservation Districts. This primarily happens when consumptive use is restricted due to needs for threatened or endangered species, or to protect surface and groundwater resources. When this happens, consultation between the agencies generally resolves the issues.

State Programs and Funding

Several Nebraska agencies regulate different water quality and water resource aspects of water reuse: the NDEQ, the local Natural Resource Districts (NRD), the Department of Natural Resources (DNR), and Nebraska Health and Human Services (HHS). If water reuse were to become more developed in the state, each agency or NRD would likely be affected. NRDs and DNR manage groundwater resources, DNR and DEQ manage surface water quality and resources, and HHS manages drinking water quality. Currently, no FTEs are specifically set aside for water reuse, other than those that work on permits that have treated wastewater applications as part of the permit request.

Funding for reuse in Nebraska comes from the Clean Water SRF, the U.S. Department of Agriculture, or private funds. The state mentioned in the WSWC 2011 Report that, occasionally, grants from the Clean Water Act Section 319 program and the Drinking

[78] Mont. Admin. R. 17.38.101(19)
[79] 119 Neb. Admin. Code § 12
[80] 119 Neb. Admin. Code § 2-001
[81] 119 Neb. Admin. Code § 12-001-01
[82] 119 Neb. Admin. Code § 12-001-02

Water SRF Source Water Protection set-aside grants can be utilized for projects like treating wastewater for golf course or field irrigation. Community Development Block Grants have also more recently been available for reuse projects.

Opportunities and Challenges

Given that Nebraska does not currently have a strong focus on water reuse, there is not much attention given to its development. Overall, when reuse has been implemented, it has received very little pushback from the public. The state previously reported that "as surface water quality criteria become more and more stringent, [reuse] allows our small towns to have an alternative to surface water discharge and have the added benefit of beneficial water reuse. It is becoming much more popular."[83] However, groundwater is abundant in the region, and is a primary source of water for many areas of the state. The integrated water planning that occurs through the NRDs and DNR does look at ways to recharge groundwater. While reused water is not currently considered for this purpose, it could be an option as drought continues to cause water shortages.

NEVADA

Water reuse is seen as an increasingly important tool to manage water resources in Nevada, as evidenced by the 2016 adoption of regulations regarding IPR. The regulations establish an "A+" standard that meets drinking water standards and allows the treated water to be used in injection wells or spreading basins to recharge aquifers. Prior to 2016, non-potable applications of reused water included irrigation, dust control, and industrial cooling processes, as well as reuse guidelines that defined "reclaimed water" and "treated effluent." There are currently 180 locations where reused water can be applied for beneficial uses [84] and 42 facilities permitted to provide reused water.

Water Reuse Governance

Water Quality

Reclaimed water is regulated through the Water Controls Chapter of the Nevada Administrative Code (NAC).[85] It defines "reclaimed water" as "sewage that has been treated by a physical, biological, or chemical process, which is intended for a use specified in NAC 445A.276 to 445A.2771, inclusive, and that meets the corresponding water quality criteria for the specified use." [86] The term does not include residential graywater. The 2016 reclaimed water regulations added the A+ category to an existing list of five reuse categories (A, B, C, D, and E) that have different water quality requirements and dictate the types of beneficial uses allowed. A reuse project must be permitted through the Nevada Division of Environmental Protection (NDEP) and the water must receive at least secondary treatment[87] before use. The discharge of a pollutant without a permit is prohibited.[88]

Water Rights

All reclaimed water may be appropriated for beneficial use, including irrigation, mining, recreation, commercial and industrial use, and certain municipal uses.[89] The state allows water to be reclaimed after storage for any beneficial purpose that is released into a natural stream or watercourse, as long as it does not impair other existing water rights.[90] There do not appear to be specific laws that regulate how reclaimed water is appropriated, or clarify if a right that is considered fully consumptive means that the user can reclaim the water in perpetuity. Nevada statutes require that every supplier of water have a water conservation plan, which must include provisions to consider increasing the reuse of effluent where applicable.[91]

The state notes that during the process of developing the 2016 IPR rule, the Nevada Department of Water Resources (NDWR) was proactively engaged with NDEP and a broad coalition of stakeholders. Their

[83] Western States Water Council (2011) *Water Reuse in the West: State Programs and Institutional Issues.* Available at www.westernstateswater.org/publications.
[84] Beneficial uses include: irrigation for landscaping, golf courses and agriculture; livestock; dust control; wetlands; and industrial uses.
[85] Nev. Admin. Code §§ 445A.274 to .280
[86] Nev. Admin. Code § 445A.27445. Approved uses are extensive and are listed by reuse categories A, B, C, D, and E.
[87] "Secondary treatment" means the treatment of sewage until the sewage has, calculated as a 30-day average, a 5-day inhibited biochemical oxygen demand concentration of 30 milligrams per liter or less; a total suspended solids concentration of 30 milligrams per liter or less; and a pH of 6.0. Nev. Admin. Code § 445A.276 sets forth the requirements for bacteriological quality of reclaimed water for categories of reuse which contemplate different levels of public contact.
[88] Nev. Rev. Stat. § 445A.465
[89] Nev. Rev. Stat. §§ 533 and 534
[90] Nev. Rev. Stat. § 533.525
[91] Nev. Rev. Stat. § 540.141

role was to ensure regulatory alignment for the ability of water rights to be assigned to the volume of IPR water returned to the subsurface so that this water was accessible and available for withdrawal and consumption at a later date.

State Programs and Funding

NDEP is responsible for issuing permits that allow reuse projects to comply with state water quality standards and the standards of the type of water they want to produce. They employ 30 FTE staff for permitting, but no one person is partially or wholly dedicated to reuse permitting.

Funding for reuse is primarily through the Clean Water SRF, which the state notes is well-funded. The SRF program incentivizes projects that address green infrastructure, water or energy efficiency improvements, or other environmentally innovative ideas, including the reuse of reclaimed municipal water. Nevada requires that any funding request include an intended use plan, which is then used to create a priority list of projects to distribute funds. The NDEP Office of Financial Assistance administers this program.

Opportunities and Challenges

Overall, the state notes that the reuse of reclaimed water is "seen to be very positive in an arid state like Nevada that has limited water resources and which continues to grow rapidly in population." However, addressing the "ick" factor of using reclaimed water is still a challenge, as many within the public may not understand the wastewater treatment process. For example, a dry playa area that was historically an infrequent floodplain uses wastewater effluent for a wetland area. When storm events occur, stormwater inundates the area and creates a perception that untreated wastewater is flooding the region.

Nevada has addressed some concerns through their regulations by requiring the use of buffer zones that correspond with the bacteriological quality of the reclaimed water (e.g., water that has undergone less rigorous treatment requires a larger buffer zone),[92] the use of purple pipe and other purple infrastructure (such as irrigation boxes) to easily identify reuse infrastructure, and signage where necessary. In addition, the new IPR rules set forth a public acceptance process for IPR proposals, which includes holding a public workshop, notifying the public through the newspaper or other means, and accepting and responding to public comments.[93] The applicants are also required to obtain a written approval from the local board of health in support of the project.[94]

Nevada identified as a challenge that much of the state is rural, thus constructing the necessary reuse infrastructure can be costly and any existing infrastructure may be unable to support treatment systems that produce higher-quality effluent. Ponds and lagoon systems may be the most appropriate treatment process for a rural area, but they create lower quality effluent that has limited uses.

The state also identified water reuse as an advantageous opportunity. Reuse provides wastewater treatment facilities with alternative methods for discharging their treated effluent where there is limited storage or infiltration capacity. Interest in direct potable reuse has begun to surface, but NDEP is unlikely to establish a DPR program anytime soon. The state is also interested in better understanding the capacity of the subsurface to act as a natural "filter" that can help with the removal of pathogens and contaminants.

NEW MEXICO

New Mexico has embraced water reuse to address water sustainability through a changing climate. New Mexico noted that it is one of the most arid states in the country, and as such is already feeling the effects of climate change. Water reuse is viewed as a way to reduce strain on surface and groundwater sources that are facing shortages and the state is actively considering how to increase and incentivize the practice. Reuse is common and growing, with most of the state's large and medium-sized municipalities practicing some form of reuse.

Water Reuse Governance

While the practice is growing, the laws and regulations addressing water reuse in New Mexico are somewhat of a patchwork. Water reuse is not uniformly defined across regulations, and many departments regulate a different aspect of reuse. For example, the New Mexico Environment Department's (NMED) Ground Water Quality Bureau (GWQB) regulates the reuse of non-potable water through

[92] Nev. Admin. Code § 445A.2756
[93] Nev. Admin. Code § 445A.27614
[94] Nev. Admin. Code § 445A.27616

groundwater discharge permits. In 2007, they created a guidance document that covers the "Above Ground Use of Reclaimed Domestic Wastewater" (2007 Reuse Guidance). In this document, "reclaimed water" is defined as "domestic wastewater that has been treated to the specified levels for the defined uses set forth in this guidance document and other applicable local, state or federal regulations."[95] The Office of the State Engineer (OSE), which regulates water rights related to reuse, defines reuse as "to use again; recycle; to intercept, either directly or by exchange, water that would otherwise return to the stream system, for subsequent beneficial use." The NMED Environmental Health Bureau (EHB) oversees the Liquid Waste Program that regulates the use of graywater for onsite irrigation reuse;[96] "reclaimed water" is not codified in these regulations for additional use beyond subsurface irrigation.

Water Quality

Statutory authority to regulate surface and groundwater quality comes from the Water Quality Act,[97] which is implemented by the Water Protection Division of NMED. The 2007 Reuse Guidance is the primary resource for developing discharge permit conditions for reuse. It provides the basis for equitable and consistent requirements for specific reuse water quality classifications and different types of uses. Additionally, New Mexico has several regulations addressing groundwater reuse permitting requirements.[98] The Construction Industries Division (CID) of the New Mexico Regulation and Licensing Department regulates the permitting and construction elements in communities that intend to utilize decentralized graywater reuse.[99]

Water quality is a concern with reused water, especially as the practice grows. The 2007 Reuse Guidance provides initial monitoring and sampling requirements within a groundwater discharge permit, and the type of monitoring is dependent upon the type of water the facility is looking to create. Similar to other states, there are different water quality requirements of reused water that depend on the ultimate intended beneficial use. The 2007 Reuse Guidance addresses four water quality parameters: (1) biological oxygen demand; (2) total suspended solids; (3) fecal coliform; and (4) treatment related capacity or ultraviolet transmissivity. Viral pathogens and other microbes are addressed through requirements for disinfection for reuse and monitoring. Additional considerations can include calculated residence time for groundwater to reach the point of extraction. As of June 2020, NMED was overseeing more than 90 discharge permits that involve some aspect of water reuse.

Water Rights

Water reuse, itself, is not considered a beneficial use in New Mexico, but rather an addition to the accounting of a valid, existing water right.[100] While OSE does accept reclaimed effluent as a source of water, the Ground Water Storage and Recovery Act[101] requires an existing water right to be in place as part of an application for underground storage. OSE regulates reuse[102] and encourages its use for water conservation and to prevent the forfeiture of water rights. Specifically, OSE directs the Interstate Stream Commission to develop water conservation strategies and policies, including water reuse and recycling, through the State Water Plan.[103]

Entities with reclaimed effluent in excess of their required return flows, such as a municipality, may apply to NMED to reuse the effluent through a discharge permit. NMED notifies OSE, which addresses the water rights aspect of the application. OSE allows a municipality to increase its authorized diversions subject to an approved Return Flow Plan without increasing its consumptive use under its permit. OSE also issues Return Flow Credits and Discharge Credits to help offset the effects of stream depletion due to ground or surface water diversions.[104]

Potable Reuse

New Mexico has been working to develop programs to manage DPR and IPR. In 2014 and 2015, NMED's

[95] New Mexico Environment Department (2007) Above Ground Use of Reclaimed Domestic Wastewater. Accessible at www.env.nm.gov/gwqb/gw-regulations/
[96] 20.7.3 NMAC
[97] NMSA 1978 Sections 74-6-1 through 17
[98] These include: 20.6.2.7.T(2) NMAC - list of toxic pollutants regulated by GWQB, 20.6.2.3000 NMAC - Permitting and Ground Water Standards, 20.6.2.5000 NMAC - Underground Injection Control, 20.7.3.804 NMAC - effluent irrigation reuse systems administered by EHB Liquid Waste Program, 20.7.3.809-810 - graywater system requirements
[99] 14.8.2 NMAC
[100] "Beneficial use" in New Mexico is defined in the constitution to be the basis, measure, and limit of a water right. Thus reuse water is not a right, in and of itself, to be developed.
[101] N.M. Stat. Ann. §§ 72-5A-1 to -17
[102] N.M. Stat. Ann. §§ 72-14-3.1 and -3.2
[103] N.M. Stat. Ann. § 72-14-3.1(C)(5)
[104] N.M. Code R. § 19.26.2.11(E)

Drinking Water Bureau (DWB) convened a panel of experts to provide recommendations for DPR which resulted in two reports that proposed general guidelines for the practice, and specific recommendations for the first DPR project under construction in Cloudcroft, New Mexico. DWB is currently working to create guidance on DPR and IPR, including a formal definition of reuse as it applies to the practices. Otherwise, there are no specific regulations that pertain to DPR beyond those in the federal Safe Drinking Water Act.

Produced Water Reuse

In 2019, the Produced Water Act[105] went into effect. This law addresses reuse and recycling of produced water from oil and gas operations and establishes that no water right is created from produced water. A key provision of the legislation is that it removed obstacles to recycling produced water and encourages the practice to minimize fresh water use for oil and gas production. It also directs the Water Quality Control Commission (WQCC) to adopt regulations to be administered by NMED regarding the storage, handling, transport, recycling, and discharge and treatment of produced water for purposes unrelated to the oil and gas sector.

State Programs and Funding

Several agencies and programs within New Mexico regulate an aspect of water reuse. These include NMED's DWB, EHB, GWQB, Surface Water Quality Bureau and Construction Programs Bureau; OSE; the Regulation and Licensing Department's CID; and the Energy, Minerals and Natural Resources Department's Oil Conservation Division. Work related to water reuse is typically spread across many staff within each of these agencies who spend a small percentage of their time on reuse. NMED estimated roughly four to five total FTEs were spent on reuse activities for the 2020 state fiscal year.

Funding for reuse comes from both state and federal funding sources. The New Mexico legislature can direct capital outlay funding to specific communities for reuse projects and the state Water Trust Fund provides a combined loan and grant program that reuse projects are eligible for. The Clean Water SRF provides funding for effluent reuse projects, and the Drinking Water SRF can be used for potable reuse projects. Funding amounts and eligibility vary by program but are generally able to cover most projects if the sponsors are willing and able to take on loans. Projects are also given additional points and access to the Green Project Reserve if they support water efficiency, energy efficiency, green infrastructure or innovation. In 2019, NMED executed 12 SRF loan agreements that ranged from $50,000 to $17 million, with only one project containing a reuse component. [106] In state fiscal year 2020, NMED entered into nine new SRF loans, including an agreement with the City of Tucumcari for a reuse project that expands their effluent reuse system.[107]

Opportunities and Challenges

As noted above, New Mexico is actively developing the regulatory and legal framework to better enable water reuse throughout the state. There have been challenges in doing so, however. One major challenge is that NMED lacks sufficient resources to expand coverage of their water reuse program. They note that they have very limited resources to administer their current water programs, even after taking into consideration both state funding and federal grants. Even though many of the rural communities would benefit most from more complex reuse projects, such as aquifer storage and recovery (ASR), only the four largest municipalities have the financial and technical resources to develop and implement such projects. The state alone cannot provide the assistance these communities need. In addition, rural communities have a lot of aging wastewater infrastructure that cannot support the production of high-quality water from their effluent.

Tension also exists between water quality and water rights laws and regulations regarding reuse. For example, state statutes do not allow aquifer recharge from flood waters without a high degree of treatment prior to injection or infiltration, which limits OSE's ability to permit projects that capture runoff from storm events. The state notes that better interagency cooperation combined with increased funding could lead to regulations that allow for these types of

[105] HR 546, amending several sections on oil and gas (N.M. Stat. Ann. § 70-2-1 et seq.) and water quality (N.M. Stat. Ann. § 74-6-1 et seq.)

[106] The City of Bloomfield has a project to replace a major process with their Sequencing Batch Reactor and make other major plant upgrades, including effluent reuse. NMED Construction Programs Bureau Infrastructure Development Report for 2019, www.env.nm.gov/construction-programs/wp-content/uploads/sites/3/2020/01/Infrastructure-Development-Report-2020-NMED-CPB.pdf

[107] NMED Construction Programs Bureau CWSRF Annual Report 2020, http://www.env.nm.gov/construction-programs/wp-content/uploads/sites/3/2020/10/2020-NMED-CWSRF-Annual-Report.pdf

projects while taking water quality and water rights issues into account.

The state has also recognized challenges implementing the new Produced Water Act. Shortly after it went into effect, NMED notified the public that there are critical scientific and technology gaps that must be addressed prior to the development of draft regulations in order to protect public health and the environment. NMED partnered with the New Mexico State University to create the New Mexico Produced Water Research Consortium. It was launched in January 2020 to coordinate expert research and technology testing to address these gaps. The passage of the Produced Water Act was somewhat controversial; non-governmental organizations (NGOs) and members of the public were concerned with the environmental and public health effects of hydraulic fracturing. However, the state noted that reuse of water within the oil and gas sector has generally been positive by reducing the use of freshwater supplies, thus reducing the need to dispose of produced water and increasing the productivity of the oil and gas industry.

Despite these challenges, the state is continuing to support reuse and work to resolve issues. The 2018 State Water Plan[108] identified 45 reuse projects to reduce water demand to community water systems. The state has also worked extensively with NGOs, academia, interstate and national organizations, other states, and community experts on reuse guidance and development of new regulations to support reuse. In addition to efforts around produced water and the creation of DPR and IPR guidelines, NMED is looking to update their 2007 Reuse Guidance document but resource limitations have stalled progress.

The state has also been proactive in addressing concerns of the public, which mirror what other states have reported. People are largely concerned with the ability to produce potable water from wastewater, and the state identified that early and ongoing public outreach is a critical component for any local potable reuse project, as well as for statewide regulations, guidance, and policy decisions relating to reuse. That being said, New Mexico has experienced positive effects in the communities that can afford to develop large reuse projects. For example, the Albuquerque Bernalillo County Water Utility Authority has been actively using ASR projects to better prepare for future water needs for irrigation.

New Mexico notes that they are "eager to explore all opportunities to increase water security for our communities and local economies," and highlights that one of Governor Lujan Grisham's top priorities is addressing and mitigating the effects of climate change on New Mexico's natural resources.

NORTH DAKOTA

Water Reuse Governance

North Dakota defines water reuse as "water that is diverted from its natural source for a specific beneficial use and used for that purpose, then subsequently reused for that same purpose prior to its discharge back into the natural system."[109] Water reuse in North Dakota is not a formalized process and is not much considered in water planning processes.

Water Quality

Wastewater can be permitted to be land applied for irrigation through a North Dakota Pollution Discharge Elimination System (NDPDES) permit issued by the North Dakota Department of Environmental Quality (NDDEQ).[110] Permits allow beneficial reuse for irrigation, construction, and oil and gas production. Wastewater intended for irrigation must be treated to secondary or tertiary levels and be compatible with the soil. Agricultural lands may only be irrigated with treated wastewater if the crops are not used for human consumption, and livestock forage is not harvested or grazed for at least 30 days after application. Irrigation sample monitoring is required on a regular basis and is prohibited within 300 feet of potable water supply wells. Wastewater intended for construction purposes, such as soil compaction, dust suppression, and washing aggregate, must receive at least secondary treatment. Sampling and monitoring are required, and chlorination is recommended when workers or members of the public will have access to or contact with the treated water.

[108] New Mexico State Water Plan (2018) Available at www.ose.state.nm.us/Planning/swp.php

[109] North Dakota's water reuse survey response. See also, North Dakota State Engineer Policy/Procedure for Transfer and Reuse of Wastewater, www.swc.state.nd.us/pdfs/wastewater_policy.pdf

[110] N.D. Cent. Code § 61-28-04; N.D. Admin. Code 33.1-16-01 et seq.

In 2019, NDDEQ issued guidelines for beneficial use or reuse of oilfield brine waters on public roads.[111] The guidance notes that, "Oilfield activity in western North Dakota has prompted interest in the potential beneficial use or reuse of oilfield by-products that would otherwise be disposed of as waste." Referencing North Dakota's hazardous waste management rules,[112] the guidance states that wastes are exempt when they are "used or reused as effective substitutes for commercial products." NDDEQ reviews and approves waste for beneficial use/reuse of produced water for public roads. Use of produced water on other roads is subject to approval from the North Dakota Industrial Commission – Division of Oil and Gas.

Water Rights

The State Engineer's Office permits water use and when doing so provides consumptive use permits, meaning that any water permitted is assumed to be fully used. The State Engineer's Office has a Standard Operating Procedure (SOP)[113] regarding water reuse. It states that, given North Dakota's consumptive water use permits, the permit holder can use and reuse the water indefinitely as long as it is used for the permitted beneficial use. If the water reaches a natural waterway, it returns to the state and its use must be authorized by another water permit.

The state allows water transfers to occur between municipal or rural water systems or industrial water permit holders that do not use water for irrigation as long as the water remains in the possession of the permit holder and does not re-enter a waterway. If change-of-use occurs when the water is transferred, a new permit is required by the receiving party. The priority date is the date of filing, and the new water permit of the receiving party will always be junior to the transferring party, pursuant to the agreement between the parties. Should the transfer agreement terminate, the right of the receiving party to the transferred water also terminates.

Once the receiving party has possession of the water, they can use it as dictated by their permit. The right of beneficial use of the party transferring the water ends with the change of possession, unless the receiving party has not obtained a water permit for a change of use. A transferring party may not deliberately increase their water use to generate more wastewater to be sold.

State Programs and Funding

Water reuse is not a formalized practice within North Dakota. However, the State Engineer's Office oversees water transfers and permits, and has a staff of 22 FTEs in its Water Appropriation Division which will address issues related to water reuse as needed. The Department of Environmental Quality, Division of Water Quality employs a staff of 40 FTEs across five programs, including issuing North Dakota Pollution Discharge Elimination System (NDPDES) permits.

There is no state-specific funding for water reuse projects, but projects may be eligible within the Clean Water SRF funding process.

Opportunities and Challenges

The state recognizes that achieving the long-term goal of water resource sustainability is greatly enhanced by the concept of reuse wherever and whenever it is economically feasible and environmentally sound. The State Engineer's Office supports reuse, especially when there are shortages in a region. There are general concerns about ensuring the quality of the water does not degrade as the water is reused, or that it does not unduly affect prior appropriators or the public interest.

OKLAHOMA

In 2012, Oklahoma became the first state in the nation to pass legislation that established a "bold, statewide goal of consuming no more fresh water in 2060 than was consumed in 2012, while continuing to grow the population and economy of the state."[114] The Water for 2060 Act set out to achieve this goal through educational and incentive-based means to "utiliz[e] existing water supplies more efficiently and [expand] the use of alternatives such as wastewater, brackish water, and other nonpotable supplies."[115] It specified a focus on projects "which promote efficiency, recycling and reuse of water" along with

[111] Guidelines for the Use of Oilfield Salt Brines in Dust and Ice Control, http://www.deq.nd.gov/Publications/WQ/5_SP/OilFieldBrine_20191210_Final.pdf

[112] N.D. Admin. Code 33.1-24-02-02(5)(a)(2)

[113] North Dakota State Engineer Policy/Procedure for Transfer and Reuse of Wastewater. www.swc.nd.gov/pdfs/wastewater_reuse_policy.pdf

[114] Oklahoma House Bill 3055, creating Okla. Stat. tit. 82, § 1088.11

[115] Id.

water use accounting, community conservation, and informational campaigns around rainwater and greywater.

Water Reuse Governance

Non-Potable Reuse

The term "reclaimed water" was added to the Oklahoma regulatory lexicon in 2012 when the Oklahoma Department of Environmental Quality (ODEQ) promulgated rules for wastewater reuse construction standards[116] and water reuse operation standards. [117] "Reclaimed water" is defined as "wastewater that has gone through various treatment processes to meet specific water quality criteria with the intent of being used in a beneficial manner." [118] The rules created four levels of treatment (Categories 2-5) that meet requirements for non-potable reuse, which are all considered beneficial use. Specifically, these include irrigation for crops, livestock, golf courses, landscape complexes, and industrial uses.

The regulations require each reuse project to have both a supplier and a water user who enter into a legally binding agreement prior to operation. Additionally, permits for both the supplier and end user are required if the end user must build infrastructure to put the water to use. Any reclaimed water infrastructure must be purple and labeled for easy identification. About 230 projects currently implement non-potable reuse.

Potable Reuse

Rules establishing standards for IPR were adopted in 2018. [119] These regulations allow water to be discharged back into a lake, stream, or river after meeting specified water quality criteria. As stated in the code, the regulations "apply to an applicant proposing the use of IPR Source Water to augment an existing source for a Public Water Supply (PWS) system."[120] Currently there are no operating projects that are subject to these rules, but there are two projects in the application process.

Oklahoma's regulations also allow for DPR on a case-by-case basis through ODEQ's Variance process. Again, there are no operational projects that are implementing DPR, but at least one is on the horizon.

Water Rights

All reuse is subject to water rights law and must not harm other water rights. As part of the Water for 2060 Act, the state notes the Oklahoma Water Resources Board (OWRB) is currently reviewing their rules to accommodate water reuse water rights using a credit system. This would likely be done through water rights permitting, but no final rules are yet in place.

State Programs and Funding

ODEQ is responsible for the implementation of the state's water reuse programs. There are no dedicated FTE's to water reuse, but the 46 full-time staff that the department employs commit their time to reuse as projects require. This includes permitting, compliance, tracking, enforcement, and administration.

The state does not have a dedicated source of funding for water reuse projects. However, reuse projects are often eligible for funding from more general infrastructure funds, such as the Oklahoma Clean Water SRF.

Opportunities and Challenges

The passage of the Water for 2060 Act has set the stage for growth of reuse in the state, as has its inclusion in the Oklahoma Comprehensive Water Plan which integrates and implements processes to help achieve Water for 2060 goals. Though Oklahoma has been permitting reuse projects since 1996, reuse was noted to be "uncommon" in the WSWC 2011 Report. Now, however, the state notes that with the public's first-hand experience with severe drought, new state policies, and favorable economics, there is increased interest in the practice.

While non-potable reuse has largely been accepted, potable reuse is more challenging. The state reports the greatest obstacle to public acceptance of DPR is the direct association with wastewater. The public is "intuitively aware that the path between wastewater and drinking water has been drastically shortened with DPR," and treatment mechanisms are not fully trusted or accepted. They noted that public education is required, along with time for people to understand and come to terms with the concept. There are also

[116] Okla. Admin. Code § 252:656-27
[117] Okla. Admin. Code § 252:627
[118] Okla. Admin. Code § 252:627-1-2
[119] Okla. Admin. Code § 252:628
[120] Okla. Admin. Code § 252:628-1-3

serious concerns regarding CECs that have yet to be addressed with both IPR and DPR. Despite these concerns, the state reports that the potable reuse projects currently in process have largely been supported by the affected citizens due to limited raw water sources, high costs of alternatives, and experience with drought.

Overall, Oklahoma has made significant progress over the past 10 years in developing and implementing the political, legal and regulatory framework that will enable water reuse to grow as they work towards the Water for 2060 goals.

OREGON

Water Reuse Governance

Oregon uses several terms for water reuse. Oregon Department of Environmental Quality (ODEQ) uses "recycled water" for reuse from municipal wastewater treatment, "industrial wastewater" from industrial wastewater treatment that have no domestic wastewater mixed in, and "graywater" for sinks, showers, and laundry discharge from residential structures. Recycled water is defined as "treated effluent from a municipal wastewater treatment system which as a result of treatment is suitable for a direct beneficial purpose."[121] Oregon Water Resources Department (OWRD) uses the term "reclaimed water" which is nearly synonymous with the definition of recycled water and is defined as "water that has been used for municipal purposes, has been treated in a sewage treatment system, and is suitable for direct beneficial purpose or controlled use that could not otherwise occur."[122]

Water reuse is not considered a beneficial use in and of itself, but the state permits a variety of beneficial purposes for water reuse based on the effluent's characteristics and the level of treatment. Beneficial use determination is what distinguishes between "water reuse" and "disposal." If wastewater is not determined to be used for a beneficial purpose, it is considered a disposal and regulated under separate rules. There are five classes of recycled water, including Classes A, B, C, D, and non-disinfected. Class A is the highest standard, while non-disinfected water can only be used for fodder, fiber, seed crops not intended for human consumption, and commercial timber. Currently, direct potable reuse is prohibited within Oregon regulations, unless a series of approvals is obtained. As of 2019, only one facility has met these standards.

As stated in the WSWC 2011 Report, Oregon's regulations specifically set forth a policy "to encourage the use of recycled water for domestic, agricultural, industrial, recreational, and other beneficial purposes in a manner which protects public health and the environment of the state."[123] ODEQ also operates a statewide program that encourages and regulates various types of reuse, including recycled water and industrial wastewater. Graywater reuse is also encouraged, with three types of permits - Type 1 (untreated graywater or filtered for solids and fats); Type 2 (water treated through a chemical or biological process such as an artificial wetland); and Type 3 (Type 2 water that has also been disinfected).

Water Quality

Oregon requires facilities to obtain a water quality permit from ODEQ in order to supply reuse water. This includes the development of a comprehensive recycled water use plan that details site and facility-specific requirements. The Oregon Health Authority also reviews proposals to reuse less treated recycled water (Classes C, D, and non-disinfected) to ensure protection of public health. Finally, all land application sites must be reviewed, posted for public comment, and approved by ODEQ before recycled water can be land applied.

Water Rights

As in other states, water rights issues can be prohibitive of implementing reuse projects; however, Oregon encourages the reuse of water. Treated municipal wastewater of "reclaimed water" may be used for irrigation or other beneficial uses as an exempt use without a water use permit or water right issued by OWRD under certain conditions. When an entity registers a reclaimed water use form with OWRD, they notify anyone with water rights that could be affected by the reuse of wastewater and potential subsequent change in delivery of effluent to a natural waterway if certain criteria are met. Those water right holders might have preference to use the reclaimed water if they can demonstrate to OWRD

[121] Or. Admin. R. 340-055-0010
[122] Or. Rev. Stat. § 537.131
[123] Or. Admin. R. 340-055-0007 (2009). See also Or. Admin. R. 340-055-0005 to 340-055-0030 (setting forth the state's primary reuse regulations).

that the cessation of discharge may impair the ability to satisfy a water right.

Oregon courts have ruled that organizations such as irrigation districts or municipalities may capture waste or seepage water before it enters a natural waterway and before it leaves the boundaries of the district.[124] However, land application of water or reuse of water requires either a permit or registration of said use.[125] This allows municipalities to capture water that has been delivered, such as treated effluent, industrial wastewater, or irrigation runoff, and reuse it within the authorized area under certain conditions. Additional information on water reuse and water rights is available on the OWRD web page.[126]

State Programs and Funding

ODEQ is the primary agency for the state's recycled water program but they work closely with OWRD and the Oregon Health Authority. Program staff in these agencies also coordinate or consult with other state agencies such as the Oregon Department of Agriculture (ODA) and Oregon Department of Fish and Wildlife (ODFW) to ensure the program is protective of human health and the environment. Currently ODEQ has three people working part-time on reuse, while OWRD and ODA each have one person with a part-time reuse portfolio.

The Clean Water SRF is the primary funding mechanism for reuse projects in Oregon, and includes planning, design and/or construction of water pollution control activities. These funds are available to any public agency in the state. The Oregon Infrastructure Finance Authority provides funding through Community Development Block Grants, special public works funds, and water/wastewater financing available for specific entities. OWRD also has funding through the Oregon Legislature to provide grants for studying the feasibility of water conservation, reuse, and storage projects, including the analyses of long-term environmental consequences of water reuse.

Opportunities and Challenges

Overall, the general population in Oregon perceives water reuse as a positive activity and has been supportive of recycled water projects. Oregon's most recent Integrated Water Resources Strategy, finalized in 2017, encourages additional water reuse projects by assessing the potential for reuse projects across the state and recommending that state agencies coordinate and communicate on reuse policies, procedures, and regulations, as well as provide incentives to increase and track water reuse. The state maintains a recycled water webpage[127] to keep the public informed and provide information to interested parties quickly and easily. The state is currently updating this website, as well as factsheets and public information forms to address current issues and concerns. The state agencies involved in reuse also make an effort to highlight the regulatory framework for water reuse during public meetings in order to assure the public of the regulatory oversight with these projects to protect public health and the environment.

Oregon has one direct potable reuse project. This project has received notable attention, primarily because the water produced by the project is sent to local breweries that take part in a competition, called the Pure Water Brew Challenge, to brew the best beer with the water produced from DPR. It has become a fun way to bring awareness to water reuse, start a discussion on how reuse can be used in a water-constrained world, and help to alleviate any concerns that people may have about drinking reused water. The challenge has been replicated in Arizona and Florida as well.

Implementation of more restrictive discharge limits has also encouraged municipalities to look at recycled water as a cost-effective alternative. While this is different from what has been reported in other states, municipalities in Oregon have been struggling to meet the low-temperature requirements for summertime wastewater discharges into waters of the state that support salmon runs. Reuse also helps to provide additional agricultural water during the time of year farmers need it the most, which means they do not have to tap into local aquifers. The state notes that some ranchers and farmers are finding they do not need to spend as much on commercial fertilizers because recycled water can provide some of those nutrients.

[124] See, e.g., *Cleaver v. Judd*, 393 P.2d 193 (Or. 1964)
[125] Or. Rev. Stat. § 537.132
[126] http://www.oregon.gov/owrd/programs/waterrights/conservation/reclaimedwater/pages/municipal-water-reuse-.aspx
[127] http://www.oregon.gov/deq/wq/programs/Pages/Water-Reuse-Recycled-Water.aspx

Despite the relative success of reuse in Oregon, there are several challenges that continue to arise. Misinformation that plays to the general public's fears and suspicions can sometimes be detrimental to projects, as well as a very vocal portion of the population that does not fully understand the science behind reuse. Part of this can be improved by better communication of the technical and scientific aspects of reuse in layman's terms, which Oregon admits can be a challenge in an agency full of scientists and engineers. While they are attempting to remedy this, funding for communications positions that help translate the agencies' work can be the first to be cut in years with tight budgets or shortfalls, which makes progress slow.

Finally, Oregon notes that for the success of a recycled water program to expand beyond agricultural irrigation and into other non-potable uses, the system design is critical. They must be designed appropriately to use recycled water, or there can be a failure. Three recycled water programs in Oregon are no longer operating because of cosmetic or design issues. Some programs that are using recycled water for toilet flushing have encountered some resistance from tenants and residents when the water in their toilets has a slight color. Two of these facilities have stopped using recycled water. Other facilities have found that readily available chillers do not function as well or fail prematurely when recycled water is used, resulting in one facility refraining from using recycled water.

SOUTH DAKOTA

Water Reuse Governance

South Dakota does not have a specific legal or regulatory water reuse framework, and little has changed over the past decade. However, there are a few references to water reuse in regulations and guidance. Additionally, the state manages land application of treated municipal and domestic wastewater through their NPDES permits and industrial wastewater via solid waste permits. The state notes that its laws advocate for water to be put to beneficial use for the general welfare of the state, and that waste or unreasonable use of water be prevented.

Water recycling and water reuse are both explicitly mentioned in the definition of "wastewater treatment works" within the Water Development chapter of their Environment and Natural Resources Rules.[128] It states that wastewater treatment works are "any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage, domestic sewage, or industrial wastes of a liquid nature to implement section 201 of the [Clean Water Act][129], or necessary *to recycle or reuse water* at the most economical cost over the estimated life of the works…"[130] (emphasis added).

Water Quality

The South Dakota Department of Environment and Natural Resources (DENR) issues permits for wastewater reuse. The most common type of wastewater reuse in the state is by irrigation or land application. This includes projects at concentrated animal feeding operations (CAFOs), which often use the wastewater to take advantage of both the nutrient load and water. Currently there are 416 CAFO permits that include water reuse through irrigation.

Permits are issued by either the Surface Water Quality Section (surface water permits for domestic/municipal use) or the Waste Management Program (solid waste permits for industrial use). The surface water permit requires plans and specifications for water reuse at a facility, and both types of permits have requirements to ensure the protection of public health and the environment. The requirements vary depending on how much humans will contact the water or land where the application has occurred. Surface water permits also require a nutrient management plan to ensure proper reuse and application. Water quality and soil sampling are required to ensure the permit conditions are met.

Water Rights

A 1975 South Dakota Attorney General's Office opinion provided guidance on the reuse of municipal wastewater, specifically in relation to water rights. It stated that land application, specifically for irrigation, by a municipality is allowed under the original appropriation as long as it is for municipal uses and does not adversely affect downstream prior appropriators. Currently, sixteen municipalities

[128] S.D. Admin. R. 74:05:08:01

[129] Section 201 of the Clean Water Act (33 USC 1281) addresses "development and implementation of waste treatment management plans and practices…"

[130] S.D. Admin. R. 74:05:08:01(29)

reuse water for irrigation. Other than this opinion, the state does not have laws, regulations, or guidance that address the appropriation of reused water for other purposes.

State Programs and Funding

DENR is responsible for issuing permits relevant to water reuse, and assigns their staff as needed to address reuse issues.

Funding for water projects is primarily available through the Clean Water SRF, and as of 2019 the state received around $7.8 million annually. So long as projects meet the applicable funding program requirements, water reuse projects compete for financial assistance like any other water or wastewater project. South Dakota issues a report periodically, the State Water Plan, that lists all water projects that have applied for funding. Currently, none of the projects are water reuse projects. These projects stay on the list for two years, and if funding is still needed at the end of the cycle, the project must reapply. The State Water Plan also includes larger projects that require federal funding or more complex financing. Projects are placed onto this list after approval by the legislature and Governor, and not removed until the legislature and Governor remove them.

Opportunities and Challenges

While water reuse is not formally defined within South Dakota's laws and regulations, the state notes that during times of drought, the ability to reuse wastewater has been an effective way to both manage low water levels for farmers and dispose of wastewater for the facilities. However, water storage during wet years is also a problem, and limits the ability of the farmer to apply the wastewater to the land. Because the state does not issue water rights for water reuse, many industrial facilities have been reusing wastewaters internally.

Water rights law could inhibit the ability of water reuse to be more fully considered in South Dakota, due to reuse potentially affecting water rights downstream. Most permitting requirements do not regulate how much water can be reused at a given facility, and thus do not inhibit the reuse of water. However, the state prohibits industrial facilities from disposing of solid waste over 200,000 tons per year without legislative approval.[131] Some facilities have proposed disposing of that much wastewater but have revised their solid waste permit applications when learning of the requirement.

Ultimately, cost is a large factor in whether a site decides to reuse their wastewater. If it is more cost effective to do so, the facility will often seek approval. Otherwise, they tend to figure out how to best land dispose of the waste. For CAFOs, using the nutrients in wastewater can offset costs of fertilizer, thus making it cost effective.

Regarding public acceptance and outreach, South Dakota State University Extension [132] hosts environmental training for CAFO operators who are required to attend as part of their DENR permit. The program brings together scientists and experts from the South Dakota State University, DENR, and the Department of Agriculture Natural Resources Conservation Service to deliver educational presentations on the topic. This has been attended by a variety of stakeholders, including crop consultants, engineers, and interested members of the public. South Dakota has not experienced much public push back regarding water reuse thus far.

TEXAS

Water Reuse Governance

Texas has been formally regulating water reuse since 1997. Permission to reuse water may be obtained in a water quality or a water rights authorization depending on whether the water has been discharged to a watercourse. Reuse is not a beneficial use, per se, but instead a type of authorization to be put to beneficial use.

Texas statutes [133] and regulations [134] address both direct and indirect reuse. Direct reuse refers to the use of wastewater effluent that has been directly conveyed from the wastewater treatment plant to the place of use via pipelines, storage tanks, and other infrastructure. Indirect reuse refers to water that is discharged into a watercourse and subsequently re-diverted for a beneficial purpose or use. Direct non-potable reuse for irrigation, industrial processes, and fracking is fairly common throughout the state, and has growing interest. Indirect water use is also becoming more common. The state noted that Texas

[131] S.D. Codified Laws § 34A-6-53
[132] See extension.sdstate.edu/

[133] Tex. Water Code Chapters 11, 15, 16, 17, 26, and 30
[134] 30 Tex. Admin. Code §§ 210, 295, and 297

water rights authorize over two million acre-feet of indirect reuse water for beneficial purposes.

Water Quality

For a direct reuse water quality authorization, the Texas Commission on Environmental Quality (TCEQ) uses the term "reclaimed water," which is defined as "domestic or municipal wastewater which has been treated to a quality suitable for a beneficial use" pursuant to provisions of the Use of Reclaimed Water Chapter of the Texas Administrative Code.[135] The regulations require that the water be treated to a certain quality depending on the type of beneficial use application. Agricultural sources are not included in the reclaimed water program. In addition, the "reclaimed water" definition does not include graywater or "alternative onsite" water; however, these reuse applications are regulated elsewhere.[136] Beneficial uses for graywater include gardening, composting, landscaping, toilet and urinal flushing, dust control, and industrial process water.

All drinking water treatment facilities have engineering designs reviewed by TCEQ to ensure the design meets the minimum standards in TCEQ's Public Drinking Water regulations, [137] including standards for regulated organic contaminants, viruses, and chlorides. Direct potable reuse projects, which use innovative technologies, do not currently have standards defined in TCEQ rules and are reviewed as rule exceptions. The use of an innovative technology to treat non-standard source water is reviewed on a case-by-case basis and must demonstrate the design and operation of the facility will produce water that meets federal and state water quality regulations. Direct potable reuse facilities undergo a stringent review process, including a full-scale or pilot-scale study and full-scale verification test to determine the operating conditions for the facility and assure it will meet drinking water standards and protect public health.

Water Rights

According to the state, the most common uses for authorized return flows are municipal and industrial use, though there has been a recent trend to authorize indirect reuse of return flows for oil and gas operations. In 2013, TCEQ expanded the definition of "municipal use" to allow municipal water right holders to satisfy non-potable uses, such as irrigating public or recreational spaces, with water authorized under an indirect reuse water right. This change helped preserve potable supplies for human consumption and eliminated the need for certain municipal water right holders to amend their indirect reuse permits to add irrigation.

A person can apply for an indirect reuse permit for either groundwater-based return flows, surface water-based return flows, or both. If the person is the discharger, the water right holder, or a contract holder, the application would be for a bed and banks authorization.[138] This application process requires protection of water rights holders that may have relied on the return flows being in the stream. Environmental impacts must also be considered.

Any person can also apply for groundwater-based[139] or surface water-based [140] return flows of other dischargers as a new appropriation of water. These types of applications are treated like any other new appropriation of water; the water must be available without affecting other water rights and the environment. In addition, these return flow permits would be terminated if the discharger or water right holder applied for an authorization for their own return flows.[141]

State Programs and Funding

TCEQ Programs

TCEQ's Wastewater Permitting Program regulates direct reuse of wastewater treatment effluent for non-potable purposes, the Drinking Water Program regulates direct reuse of wastewater treatment effluent for potable purposes, and the Water Rights Program regulates indirect reuse. In addition, the Water Supply Division reviews engineering designs for drinking water treatment facilities to ensure compliance with state water quality regulations.

Some water reuse may be conducted by using underground injection wells. TCEQ and the Railroad Commission of Texas have split jurisdiction for the Underground Injection Control (UIC) program, which regulates the injection of water into the subsurface. Injection of water associated with reuse projects can be conducted as aquifer recharge (AR), aquifer storage and recovery (ASR), and subsurface fluid

[135] 30 Tex. Admin. Code § 210.3
[136] 30 Tex. Admin. Code § 210 Subchapter F
[137] 20 Tex. Admin. Code § 290
[138] Tex. Water Code § 11.042
[139] Tex. Water Code §11.121
[140] Tex. Water Code §11.046
[141] Tex. Water Code § 11.042

distribution systems, which exclude subsurface area drip dispersal systems.

In the case of AR and subsurface fluid distribution systems, the injected water becomes regulatorily indistinct from groundwater. Withdrawal of the injected water would be subject to the same regulations as withdrawal of the native groundwater, so the withdrawal would be regulated by a groundwater conservation district (GCD), subsidence district, or local authority that has jurisdiction where the withdrawal occurs. In the case of ASR, the entity operating the ASR is permitted to withdraw water it has injected. GCDs and local authorities regulate the volume of groundwater withdrawn from their aquifers, so those authorities have a responsibility to be aware of the volume of water withdrawn.

There are at least five staff members within TCEQ with a full time or part time reuse portfolio, and two people within UIC who partially focus on water reuse projects that use injection wells. TCEQ's water rights permitting program does not have any specific FTEs dedicated to reuse, but any staff can address these issues as they arise.

TWDB Project Funding

The Texas Water Development Board (TWDB) water reuse program was established in 2009 under the Innovative Water Technologies department, whose mission is to advance alternative water supplies. TWDB offers a variety of cost-effective loan and grant programs that provide for the planning, acquisition, design, and construction of water-related infrastructure and other water quality improvements, which includes water reuse projects. These programs include loan opportunities for political subdivisions with a wide range of eligible project activities, including the water and wastewater treatment conveyance elements necessary to develop a water reuse system. Interest rates reflect the costs resulting from the issuance of state general obligation bonds. The state also administers the Clean Water SRF that provides affordable financing for water infrastructure projects. In the state FY2020, the Clean Water SRF Intended Use Plan allocated $4.6 million to "green" projects, including water reuse.

Opportunities and Challenges

TCEQ has been a national leader in developing and permitting direct potable reuse projects. In 2013, they permitted the first DPR facility in the country for the Colorado River Municipal Water District in the City of Big Spring. This facility uses microfiltration, reverse osmosis, and advanced oxidation with ultraviolet light to treat the effluent from the City of Big Spring's wastewater treatment plant. The water is then blended with lake water in a transmission pipeline and pumped to five drinking water facilities, serving 250,000 people, for further drinking water treatment.

Many public water systems approached TCEQ about DPR during the most recent severe drought (2009-2015), but as of 2019, only a small number of public water systems are still considering DPR as a long-term solution. Previously, the City of Wichita Falls was approved for an emergency DPR project to address reservoir depletion due to drought, but it only operated for approximately one year. In addition, the El Paso Public Utility Board, the City of Buda, and the West Travis County Public Utility Agency are currently pursuing direct potable reuse projects.

Public perception and acceptance of water reuse has been acknowledged by the state as a barrier to fully developing its potential, especially when it comes to DPR. TCEQ drinking water program staff openly discuss the issue with water systems and suggest outreach and educational efforts to alleviate concerns. In addition, TCEQ presents reuse information to the public in various forums. Public outreach is otherwise largely left to the political subdivisions that undertake reuse projects.

Regarding direct potable and non-potable reuse, Texas notes that the public is primarily concerned about public safety, infrastructure costs, and an inconsistent water reuse customer base, particularly on the industry side. This concern arises from the use of direct non-potable reuse water for irrigation and landscape purposes that can result in demand surge during growing seasons, leaving facilities underutilized during other times of the year. Overall, Texas has had positive experiences with water reuse projects, with increasing interest regarding potable reuse as a viable alternative water supply strategy in Texas.

Texas has authorized the executive director of the TWDB to conduct annual groundwater and surface water surveys, including reuse of the water, for municipal, industrial, power generation, or mining purposes to collect data that can be used in long-term planning. Reuse data collected from the survey informs the state's 16 regional water planning groups

on the current and potential future volume of reuse supplies. These planning groups provide policy recommendations in their draft water plans. Current recommendations suggest that there are regulatory barriers and a lack of funds available for both research and implementation of reuse projects.

In the most currently adopted State Water Plan (2017), existing water supply from reuse (currently physically and legally available) is 564,000 acre-feet (AF) in 2020 and 723,000 AF in 2070. This increase in total reuse over the planning horizon is primarily due to an increase in wastewater flows associated with an increasing population and the capacity of existing reuse facilities. Recommendations for the development of future reuse sources in 2020 would produce 230,000 AF of indirect reuse; 33,000 AF direct potable reuse; and 163,000 AF of other direct reuse (e.g. non-potable industrial use). In 2070, indirect reuse would provide 649,000 AF; direct potable reuse 87,000 AF, and 'other' direct reuse 371,000 AF.

UTAH

Water Reuse Governance

Utah began regulating water reuse in 2006 when the Utah Legislature passed the Wastewater Reuse Act, also known as "73-3c."[142] The law was enacted to specifically address how to regulate publicly owned treatment works (POTWs), which effectively limited the implementation of water reuse projects. Prior to passage of this law, Utah's state water plan defined reuse as "the direct use of wastewater, which involves the application of some degree of treatment, and the planned use of the resulting effluent for a beneficial purpose." Currently, water reuse is defined as "domestic wastewater treated to a standard acceptable under rule made by the Water Quality Board" (WQB).[143]

Entities eligible to apply for a reuse project permit must: (1) be a public agency and (2) gain approval from the Water Quality Board and the State Engineer. The State Engineer will evaluate the underlying water rights during their approval process.

Water Quality

As stated in the WSWC 2011 Report, The Legislature recognized that some reuse projects may be necessary for some POTWs, but may also not be approvable by all interests. Thus, it gave WQB a "dispensation" to allow an entity to change its point of discharge for: (1) treatment purposes; (2) to enhance the environment; (3) to protect public health, safety, or welfare, or (4) to comply with WQB rules or a POTW's discharge permit. Under these circumstances, the WQB does not need to fulfill all of the approval requirements for a reuse project and needs only to consult with the State Engineer. In operating parlance, these changes in point of discharge are considered to be "disposal" projects instead of "water reuse" projects.[144]

Notably, reuse activities with industrial source waters are evaluated and permitted on a case-by-case basis to protect human health and the environment. Additionally, Utah does not require water quality testing at POTWs for chlorinator injector water; clarifier, filter, and related units' washdown water; or irrigation water used for landscaping at POTWs where the public does not have access.

Water Rights

Water reuse is considered a beneficial use, consistent with other uses in the state. The reuse at a particular site must be within the underlying water right. Water rights can be a potentially limiting aspect of developing water reuse projects in Utah. The water right for reuse is held by the original water right holder, and must allow for complete depletion (e.g. it must be fully consumptive) in order for a POTW to develop a reuse project. The Utah Division of Water Rights reviews these applications and issues a Sewer Effluent Reuse permit that specifies the amount of water that can be reused. Any water that is released back into a state water is eligible for reallocation; however, since the basins in Utah are fully allocated, few of these rights have been issued. POTWs have also expressed that there is not a huge incentive for them to discharge water to fill these rights, since they are junior to the original water rights holder.

[142] Utah House Bill 38 ; Utah Code Ann. §§ 73-3c-101 to 401, 19-5-101 to 124
[143] Utah Code Ann. § 73-3c-102

[144] Western States Water Council (2011) *Water Reuse in the West: State Programs and Institutional Issues.* Available at www.westernstateswater.org/publications.

Utah's reuse regulations for non-potable reuse [145] define two classes of reuse water: Type 1, which requires filtration of the effluent and is suitable for public contact; and Type 2, which requires secondary treatment of conventional pollutants and anticipates infrequent public contact. At a minimum, organics oxidation and disinfection are required.

State Programs and Funding

Water reuse projects must be approved by both the Utah Department of Water Quality (DWQ) and the State Engineer within the Division of Water Rights. DWQ has the authority over the uses and quality of the reuse water, while the Division of Water Rights has authority over the water rights and quantity that may be used. Currently, the Division of Water Resources is including water reuse as part of Utah's overall state water planning and evaluation activities. Across these divisions and the Division of Drinking Water (DDW), the state estimates there is 0.25 FTE dedicated to water reuse.

Public entities can apply for funding through Utah's Clean Water SRF. Reuse projects are eligible for green project reserve credit under this program, which if funded can lead to an additional 0.25% to 0.50% interest rate reduction.

Opportunities and Challenges

With approximately 36 projects in operation, reuse is a strategy that has been highlighted in past State Water Plans[146] and was mentioned within the 2017 Recommended State Water Strategy report compiled by former Governor Gary Herbert's Water Strategy Advisory Team.[147] The Utah Legislature adopted a State Water Policy during the 2020 Legislative Session that highlighted the need for water conservation and efficiency, along with "water resource development and the creation of new water infrastructure necessary to meet the state's growing demand and promote economic development."[148]

As mentioned above, there are several challenges related to reuse development within Utah. At the center of these challenges are issues involving water rights and cost. With the passage of 73-3c, any entity with a stake in the water right could deny permission for the applicant to develop a water reuse project, which has made it difficult for some projects to get approval.

In a comment letter to EPA on the development of the EPA Water Reuse Action Plan, Utah DWQ, the Utah Division of Water Resources, and the Utah Department of Agriculture and Food expressed concerns about the downstream impacts to water rights holders and the environment from reuse projects. Specifically, they suggested EPA "study overall watershed flow changes due to reuse projects and offer methodologies that states can use to evaluate these impacts."[149] They also suggested that EPA develop a repository of relevant statutes, case law and academic articles relevant to "prior appropriation" states "to provide states with resources as they individually decide how to adopt existing water rights statutes and administrative programs to accommodate water reuse projects."[150] Stakeholders have also expressed concerns with how reuse could exacerbate the decreasing levels in the Great Salt Lake, an economic and environmental boon to the region.

The EPA letter also notes the interest of Utah agencies in "the utilization of produced water from oil and gas extraction facilities." With significant oil and gas development in Utah and with water as a limited resource, the State would like to see development of guidance on treating and using produced water so that potential reuse projects generating this water can be properly permitted, monitored, and evaluated.

The low cost of raw water in Utah has also provided little incentive for the development of reuse projects. Utah has well-developed storage and delivery infrastructure that keeps costs significantly less than that of water from reuse projects. In addition, the

145 Utah Admin. Code r.317-1-5, 317-3-11, 317-13, and 317-14
146 State of Utah Department of Natural Resources, Division of Water Resources (2005) Utah State Water Plan: Water Reuse in Utah. Available at water.utah.gov/wp-content/uploads/2019/12/Water-Reuse-in-Utah-Water-Resources-2005.pdf
147 In 2013, former Utah Governor Gary R. Herbert invited a group of stakeholders with extensive backgrounds in various aspects of water and with a diverse set of perspectives to form the State Water Strategy Advisory Team. He asked them to conduct a process to devise a set of recommendations to be incorporated into the 50-year water plan. The 2017 Recommended State Water Strategy is a result of that effort. Available at extension.usu.edu/employee/files/Recommended-State-Water-Strategy-July-2017.pdf and www.envisionutah.org/utah-water-strategy-project
148 Utah House Bill 41 State Water Policy Amendments
149 State of Utah. Comments on the Environmental Protection Agency's Water Reuse Action Plan. Docket ID No. EPA-HQ-OW-2019-0174. Submitted December 16, 2019.
150 Id.

treatment standards would require expensive retrofits on many of the POTWS; however, many facilities across the state are being renovated and these technologies may be installed with the renovations.

Utah has not experienced significant environmental or public health issues from reuse water that has been properly treated. Some pilot projects have shown that the long-term viability of soils may be impacted from the increased salinity in reused water, but this can likely be managed. Utah has also been studying and following issues involving contaminants of emerging concern, but would like to see a national consensus or policy developed on the risks posed by them and how to treat and dispose of them before taking more local action.

Utah does not have indirect potable reuse or direct potable reuse laws and regulations, but the state notes these projects have been discussed and inquired about. If these projects were to be permitted, DWQ and DDW would jointly work together. DWQ would handle wastewater treatment for discharges, while DDW would permit the advanced drinking water treatment facility. The divisions believe they currently have sufficient authority to permit these projects on a case-by-case basis.

Finally, the Utah public has not shown huge concern with reuse, especially agricultural irrigation or pressurized irrigation using reuse water. However, when direct or indirect potable reuse become more viable options, DWQ anticipates there will be a need for significant public outreach. Likely, this outreach would be led by the local water purveyor in partnership with the local wastewater agency.

WASHINGTON

Washington initially codified reuse practices in 1992 under the Reclaimed Water Use Act.[151] In 2018, the Washington State Department of Ecology (Ecology) completed and adopted rules, after nearly a decade of development, that encourage the use and production of reclaimed water.[152] These rules are explained in more detail below. Overall, water reuse is supported and promoted by the state.

Water Reuse Governance

Washington defines "reclaimed water" in statute as "water derived in any part from wastewater with a domestic wastewater component that has been adequately and reliably treated, so that it can be used for beneficial purposes. Reclaimed water is not considered a wastewater."[153] The statute also defines "agricultural industrial process water" and "industrial reuse water" as waters that have been used for an agricultural or industrial purpose and treated to a standard that allows the water to be used for another beneficial use. Authority for project review and facility permitting falls under the state Water Pollution Control law.[154]

Water Quality

Ecology and the Department of Health (Health) jointly adopted regulations regarding the use of reclaimed water in 2018 "to help meet the growing need for clean water across the state by establishing a regulatory framework for the generation, distribution, and use of reclaimed water for the beneficial uses."[155] These rules were adopted after years of department collaboration and extensive stakeholder outreach and input. As part of this process, Ecology developed a guidance document for facilities that produce reclaimed water or are interested in developing a reclaimed water project.[156]

Reclaimed water permit eligibility is limited to (1) a municipal, quasi-municipal or other governmental agency; (2) a private utility, if it meets certain requirements;[157] or (3) the holder of an active on-site sewage treatment permit. The rule specifies that Ecology and Health both must review reclaimed water permits prior to issuance. The lead agency depends on which type and size of facility will produce the reclaimed water. The agencies must work together to ensure the treatment methods will protect both public health and the environment, and a permit cannot be issued until both agencies approve. The public has the opportunity to comment on the permit, and the permits are issued for five years. The facility can renew their permit if they remain in compliance.

The regulations create three categories of water – A+, A and B – that are treated to different standards depending on the beneficial uses for which the

[151] Wash. Rev. Code § 90.46
[152] Wash. Admin. Code § 173-219
[153] Wash. Rev. Code § 90.46.010
[154] Wash. Rev. Code § 90.48
[155] Wash. Admin. Code §173-219-020
[156] Reclaimed Water Facilities Manual: The Purple Book, fortress.wa.gov/ecy/publications/documents/1510024.pdf
[157] See Wash. Admin. Code § 173-219-180

reused water is to be applied. Beneficial uses for B water, the lowest grade water within this ranking, include irrigation of orchards or vineyards, irrigation of process food crops, and frost protection of orchard crops. Beneficial uses for A water include toilet/urinal flushing, laundry, water features with public contact, irrigation with direct or indirect public access, irrigation of food crops, and direct groundwater recharge. A+ water can be used for DPR and must meet the water treatment standards of A water, along with any additional case-by-case requirements to get it to DPR quality. In addition, the State Board of Health must approve any DPR project. Currently, no facilities are producing A+ water.

Water Rights

Reclaimed water projects cannot impair existing water rights. [158] Each project requires an "impairment analysis" to determine if any existing water rights will be affected by development of a project and must be approved by a licensed state engineer or hydrogeologist. If water rights are to be impaired, a detailed compensation and mitigation proposal must be included in the permit application for consideration. This includes water allocated for instream flows. Ecology works jointly with the applicant to address any issues that may arise with the Washington Department of Fish and Wildlife or tribes prior to approving the project application. Despite the requirement to address water rights in the new rule, Washington notes there is still ongoing debate about how to permit increased consumptive use from reclaiming water and how to address potential impacts on existing water rights. These provisions also "severely limit" the production and use of reclaimed water in some parts of the state. However, if a permit is approved, the reclaimed water producer is granted exclusive rights to the water and exempts the use, distribution, storage, and recovery from storage of reclaimed water from water rights permitting.[159]

State Programs and Funding

As detailed above, both Ecology and Health have responsibilities to support reclaimed water projects. The Water Quality Program within Ecology was responsible for the initial rule development. Currently statewide, there are approximately 4.6-5.6 FTEs dedicated to water reuse. This breaks down as 4.5-5.5 FTEs for municipal water reclamation between Health and Ecology, and 0.1 FTE for industrial water reuse.

Funding for water reuse projects is available through the state Centennial Clean Water Grants program, as well as the state Clean Water SRF. Reclaimed water facilities are also eligible for the "Green Projects Reserve" funds through the Clean Water SRF. The state notes that generally, projects with water quality benefits are eligible for these funds; however, those with strict water supply benefits are not. Through the state Centennial program, projects are eligible for a maximum of $5 million if they meet the "hardship" criteria. SRF projects can get loans for around $40 million per applicant per year, and projects can apply for funding over multiple years.

Opportunities and Challenges

The state recognizes that "water is not an infinite resource and as the population grows and the climate changes, clean potable water becomes even more valuable as a resource." Ecology's 2009 Report to the Legislature[160] included water reuse as an approach for meeting future water supply needs in 22 of 29 watershed plans. Washington has taken steps in recent years to encourage water reuse, as well as define a legal mechanism for facilities to use reclaimed water.

Washington has seen many positive benefits of using reclaimed water. In addition to the benefits of reducing potable water supply demand, reuse projects have contributed to environmental and recreational benefits for communities. Examples include (1) wetland enhancement within the 59-acre Chinook Bend Natural Area that uses reclaimed water from the Carnation Treatment Plant and is open for public enjoyment; (2) the 8-acre Cochrane Memorial Park near Yelm is a constructed wetland park and aquifer recharge facility that solely uses reclaimed water; and (3) the City of Medical Lake in Spokane County that uses reclaimed water to irrigate city fields and Washington's first Veterans' Cemetery.

Two big challenges to reuse are (1) public acceptance of and trust in the safety/quality of reclaimed water, and (2) the potential for impairment of existing water rights. The state engaged in extensive statewide stakeholder outreach prior to developing the 2018

[158] Wash. Admin. Code § 173-219-090

[159] Wash. Rev. Code §90.46.120 (wastewater treatment facility), §90.46.150 (agricultural), §90.46.160 (industrial)

[160] Washington Department of Ecology. 2009 Report to the Legislature: Watershed Plan Implementation Statutory Changes, Progress Report on Setting Instream Flows, and Reclaimed Water in Adopted Plans

rule, and continues to put resources towards public education regarding the safety of reclaimed water. Their main message focuses on the fact that the water is highly treated and continually tested to ensure safety. Regarding water rights impairment, as noted above, the state cannot permit a facility that will affect existing rights. While a compensation proposal is required for projects that may affect water rights, there is no approach or process defined in statute or rule that guides this compensation.

WYOMING

Water reuse is a growing practice in Wyoming, with several municipalities – including Cheyenne and Casper – implementing wastewater treatment projects in the past decade. Most of these projects land-apply domestic wastewater for irrigation, but other sources such as power plant cooling water, industrial scale livestock operations, produced water from conventional and unconventional oil and gas development, and to a limited extent, coal bed methane operations are also reused in large quantities. Increasing the reuse of produced water is of local interest due to the number of oil and gas operations in the state.

Water Reuse Governance

Wyoming encourages water reuse where feasible, though they do not have a formal reuse program. In 2015, the rules regulating reuse were reorganized and included within the chapter on design and construction standards for water treatment systems. Though some language was removed in the reorganization, the initial intent of the Standards for the Reuse of Treated Wastewater was to "encourage and facilitate the productive and safe reuse of treated wastewater as a viable option in the management of the state's scarce water resources. The use of treated wastewater for non-potable purposes through 'source substitution' or replacing potable water used for non-potable purposes is encouraged."[161]

Water Quality

Wyoming regulations use the term "treated wastewater," which means "domestic sewage discharged from a treatment works after completion of the treatment process." [162] The Wyoming Department of Environmental Quality (WDEQ) Water Quality Division oversees permitting the reuse of wastewater for various types of beneficial uses, including land application (e.g. irrigation, fertigation), discharge into a water of the state (e.g. livestock watering, irrigation, cooling water), and discharge into the subsurface (sub-irrigation). Depending upon the type of discharge, the quality of wastewater to be reused is regulated to ensure the protection of surface and groundwater quality, human health, and the environment. With the exception of some coalbed methane produced water, most other sources of wastewater require treatment to regulatory limits prior to reuse.

WDEQ has specific regulations associated with domestic water reuse that establishes standards to address the primary health concerns associated with the reuse of treated wastewater. [163] The state regulates wastewater reuse from agricultural sources through the nutrient management plans that are part of its NPDES (WYPDES) program. It also uses the WYPDES program and WDEQ rules to regulate produced water reuse. Water reuse permittees must self-monitor and report, with occasional inspection from the Water Quality Division.

Water Rights

The Wyoming State Engineer's Office (SEO) is responsible for regulating the water rights aspects of water reuse. The state recognizes reuse as a beneficial use. In general, municipalities have an inherent right to use their wastewater discharges as they would like. However, the Wyoming Supreme Court made clear in *Thayer v. Rawlins*[164] that anyone who adds water to the natural flow of a stream is entitled to take that same amount of "imported" water back out for their own use, even if doing so affects a senior water right.

Produced Water Reuse

The Wyoming Oil and Gas Conservation Commission (WOGCC) regulates the use of treated produced water for reuse as drilling makeup water, as well as to offset the large volumes of fresh water that have normally been used for hydraulic fracturing. Wyoming is beginning to see increasing interest from oil and gas development areas to develop recycling and reuse of treated produced water, utilizing centralized wastewater treatment systems and

[161] 020-080 Wyo. Code. R. §021(1); this reorganized section is now located at Wyo. Code R. § 020-0011-11 Part H
[162] Wyo. Code R. §020-0011-11.H(x)
[163] Wyo. Code. R. §§020-0011-11.H.71, .75 and .76
[164] *Thayer v. Rawlins,* 594 P.2d 951 (Wyo. 1979).

connective pipeline networks to connect well operations directly to treatment works.

State Programs and Funding

WDEQ and SEO are jointly responsible for water reuse activities. As the state does not have a formal water reuse program, no specific FTEs are dedicated to reuse. The state did not provide an estimate of how much time employees that work on permitting and/or water quality standards spend on reuse projects.

Reuse activities in Wyoming have received funding through the Wyoming Water Development Commission with mineral tax revenues, and through Wyoming's Clean Water SRF program. Wyoming also provides state funding through both grants and loans. Because of the scarcity of water in Wyoming, any practical reuse project will usually warrant strong consideration for funding.

Opportunities and Challenges

As with other states and municipalities, public concern regarding the safety of reuse of treated municipal wastewater has posed challenges for reuse projects that involved irrigation reuse in public areas. Extensive community education regarding the benefits of wastewater reuse has proven to be successful in lessening those concerns.

As noted in *Thayer v. Rawlins*, interstate compacts can supersede the ability of municipalities to use their wastewater discharges as they see fit, despite the municipalities generally having control over how their resources are used. In particular, Wyoming reported in the WSWC 2011 Reuse Report that the Platte River Compact "severely limits" wastewater reuse along the North Platte River because treating the water discharge to the river has proven "far less expensive than [the] legal expenses [needed] to attempt to resolve interstate issues to allow wastewater reuse."[165]

Recent emphasis on the benefits of wastewater reuse at the national level, such as EPA's National Water Reuse Action Plan, as well as localized concerns with episodic and recurring drought conditions, has brought forward increasing interest and emphasis for consideration of treated oilfield produced water as a readily available, alternative source of water for irrigation purposes. In 2020, the WDEQ developed a regulatory permitting system to help facilitate the development of this alternative in a safe and effective manner that is protective of the environment. While yet in its infancy, this new option for reuse has the potential to benefit not only the agricultural community, but also the oil and gas industry in managing produced water for beneficial purposes.

[165] Western States Water Council (2011) *Water Reuse in the West: State Programs and Institutional Issues.* Available at www.westernstateswater.org/publications.

OVERVIEW OF STATE LEGAL AND REGULATORY FRAMEWORKS FOR WATER REUSE

	Water reuse term & definition	Is water reuse recognized as a beneficial use?	Reuse statutes	Reuse regulations	Reuse guidance and case law	Agencies with jurisdiction over reuse
AK	NA	No	NA	Wastewater Treatment and Disposal: Alaska Admin Code 18-72	NA	Quality: Alaska Department of Environmental Conservation
AZ	Reclaimed water: water that has been treated or processed by a wastewater treatment plant or an on-site wastewater treatment facility	Yes	Arizona Revised Statutes § 49-201(32); ARS § 45-101(4) & 101(8) (Definitions) ARS 49-221.E (Water quality standards) ARS 45-801.01 & § 49-203.A.6 (Water policy) ARS 45-802.01(23) (Stipulations on water storage and use) ARS 812.01 (Groundwater savings facility permit)	Reclaimed water rules: Arizona Administrative Code R18-9-A701 - E701 *R18-9-E701 is specific to Direct Potable Reuse Reclaimed water quality standards: AAC R18-11-301 - 309	Guidance Framework for Direct Potable Reuse in Arizona, https://west.arizona.edu/sites/default/files/NWRI-Guidance-Framework-for-DPR-in-Arizona-2018.pdf Arizona Department of Environmental Quality Recycled Water Work Groups Final Report, https://static.azdeq.gov/wqd/combined_workgroup_final_report.pdf	Quality: AZ Dept. of Environmental Quality, Water Quality Division Quantity: AZ Dept. of Water Resources
CA	Recycled water: water that as a result of treatment of waste is suitable for a direct beneficial use or a controlled use that would not other wise occur, and is therefore considered a valuable resource.	Yes – for the purpose of setting water quality standards. But it is not a beneficial use for the purposes of administering water rights	Cal Water Code §§ 13500-13558.1 (Water Reclamation) CWC §§ 13560-13570 (Potable Reuse) CWC §§ 13575-13583 (Water Recycling Act of 1991) Other related statutes contained within the Fish and Game Code, Government Code, Public Utilities Code, Health and Safety Code, and Water Code listed at https://www.waterboards.ca.gov/drinking_water/certlic/dri	Recycled water: Cal Code Regs. Title 22 §§ 60301 – 60355 Drinking water: CCR Title 17 §§ 7583-7605 Additional information at: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/rwregulations.pdf)	Multiple documents available at http://www.swrcb.ca.gov/water_issues/programs/#waterrecycling, including the 2018 Recycled Water Policy and recent 2018 Science Advisory Panel Report on Contaminants of Emerging Concern	Quality and Quantity/General permits: State Water Resources Control Board Quality and Quantity/Individual permits: Regional Water Quality Control Boards Public Health: California Dept. of Public Health

			nkingwater/documents/lawbook/rwstatutes20190101.pdf			
CO	Reclaimed water: Domestic wastewater that has received secondary treatment by a domestic wastewater treatment works (centralized system or localized) and such additional treatment as to enable the wastewater to meet the standards for approved uses.	Yes	Colo. Rev. Stat. § 25-8-103 (Colorado Water Quality Control Act)	Reclaimed Water Control: 5 Colo. Code. Regs. § 1002-84 Graywater Control: 5 CCR § 1002-86 Other related regulations: 5 CCR § 1002-22 *id.* § 1002-61 *id.* § 1002-62 *id.* §§ 1002 71-74 Direct Potable Reuse (DPR) regulations are in development and would potentially add DPR rules to the existing regulatory structure for public drinking water systems, 5 CCR § 1002-11	Water Quality Policy 21 Water Quality Policy 25 Implementation Policy Number: Clean Water 7 Guidance for Completing Nitrogen Agronomic Rate Analysis Guidelines for Direct Potable Reuse in Colorado (2019)	Quality: CO Dept. of Health, Water Quality Control Division Quantity: CO Dept. of Natural Resources, Division Of Water Resources
ID	Reuse: The use of ***recycled water*** for irrigation, groundwater recharge, landscape impoundments, toilet flushing in commercial buildings, dust control and other uses.	Yes	Idaho Code Ann. § 39-102 (Environmental Quality – Health) If injection wells are considered for recycled water, IC § 42-3901 et seq. would also apply	Recycled Water Rules: Idaho Admin Code (IDAPA) 58.01.17 Wastewater Rules: IDAPA 58.01.17 Other related regulations: IDAPA 58.01.02 IDAPA 58.01.03 IDAPA 58.01.09 IDAPA 58.01.11 IDAPA 24.05.01 If a potable recycled water use meets the requirements of a public drinking system, IDAPA 58.01.08 would apply	Multiple guidance documents available at https://www.deq.idaho.gov/laws-rules-etc/deq-guidance, including "Guidance for the Reclamation and Reuse of Municipal and Industrial Wastewater" and "Wastewater Land Application Operators Study and Reference Manual."	Quality: ID Dept. of Environmental Quality (IDEQ) Quantity: ID Dept. of Water Resources
KS	No formal definition	Yes	No specific statutes for reuse. Related statutes: Kan. Stat. Ann. § 65-165 (Sewage discharge permits) KSA § 82a-702 (Waters and Watercourses)	NPDES permits and State Water Quality permits regulate reuse. NPDES permits: Kan. Admin. Regs § 28-16-58--63 Water quality standards:	Potential Health Effects of Municipal Water Reuse in Kansas (2017), https://www.khi.org/assets/uploads/news/14793/waterreusehiawebs.pdf	Quality: KS Dept. of Health and Environment, Bureau of Water Quantity: KS Dept. of Agriculture, Division of Water Resources

			KSA § 82a-711 and 711(a) (Appropriation of Water for Beneficial Use) KSA § 82a-520, Art. V, Sec. H (Arkansas River Compact, re: ability to divert water that would deplete or adversely affect water supply)	KAR § 28-16-28 Other related regulations: KAR § 28-16-57a KAR § 5-1-1(kkkk) KAR § 5-3-5b KAR § 5-5-3	Kansas Water Vision (2015), https://kwo.ks.gov/water-vision-water-plan/water-vision	Planning & coordination: Kansas Water Office
MT	Reclaimed wastewater: wastewater that is treated by a public sewage system for reuse for private, public, or commercial purposes. Reuse: the practice of placing reclaimed wastewater into service in a manner appropriate with the level of treatment.	No – reclaimed water is to be put to beneficial use	Mont. Code Ann. § 75-6-102 (Reclaimed wastewater definition) MCA § 75-6-103 (Board directed to establish approved uses of reclaimed wastewater) Related statutes: MCA Title 85 (water rights)	The Montana Discharge Elimination System permits: Administrative Rules of Montana Ch. 17.30.12 & 17.30.13 Groundwater Pollution Control System: ARM Ch. 17.30.10	Circular DEQ-2: Design Standards for Public Sewage Systems (updated 2012), https://deq.mt.gov/Portals/112/Water/WQInfo/Documents/Circulars/Circulars/2018DEQ-2.pdf	Quality: MT Dept. of Environmental Quality Quantity: MT Dept. of Natural Resources and Conservation MT Board of Environmental Review (Rulemaking authority)
NE	No formal definition	Yes	No specific statutes for reuse Related statutes: Neb. Rev. Stat. § 81-1505(8) (Water pollution control)	Reuse regulated under the NE's NPDES program: Neb. Admin Code. Title 119, Ch. 12	NA	Quality: NE Dept. of Environmental Quality Quantity: NE Dept. of Natural Resources Public Health: NE Health and Human Services Natural Resources Districts
NV	Reclaimed Water: sewage that has been treated by a physical, biological or chemical process, which is intended for a use identified in NAC 445A.276 to 445A.2771, inclusive, and section 11 and that meets the corresponding water quality criteria for the specified use. The term	Yes	Nevada Revised Statutes § 445A.300-730 (Water Pollution Control) NRS § 445A.800-955 (Public Water Systems) NRS § 540.141 (Water Conservation Law under State Engineer)	Use of Reclaimed Water: NAC 445A.274-280 Water Pollution Controls: NAC 445A.070-280 Indirect Potable Reuse: NAC 445A.27612 Discharge Permits: NAC 445A.228-263	WTS-1A: General design criteria for reclaimed water irrigation use & WTS-1B: General criteria for preparing an effluent management plan, https://ndep.nv.gov/water/water-pollution-control/resources/publications-technical-guidance	Quality: NV Department of Environmental Protection, Bureau of Water Pollution Control Quantity: State Engineer's Office

	does not include graywater.					
NM	Reclaimed water (as defined in the Reuse Guidance): Domestic wastewater that has been treated to the specified levels for the defined uses set forth in this guidance document and other applicable local, state, or federal regulations . Reuse (as defined by the Office of the State Engineer): "…to intercept, either directly or by exchange, water that would otherwise return to the stream system for subsequent beneficial use."	No – reuse water is not a water right to be developed, but rather an addition to the accounting of a valid existing water right.	NMSA §§ 74-6-1 – 17 (Water Quality Act) *Id.* §§ 72-14-3.1 -- 3.2 (State Water Plan and Water Conservation) *Id.* 19.26.2.11(E) (Return Flow Credit)	Ground and Surface Water Protection: NMAC § 20.6.2 Liquid Waste Disposal: NMAC § 20.7.3 Graywater: NMAC § 14.8.2 Produced Water: NMAC § 19.15.34	*Reynolds v. City of Roswell*, 654 p.2d 537 (N.M. 1982) - Addressed municipality's right to reuse effluent "Above Ground Use of Reclaimed Domestic Wastewater" (Reuse Guidance), https://www.env.nm.gov/gwqb/gw-regulations/ NMED DWB working to create guidance for DPR and create a formal definition of reuse as it relates to DPR and IPR	Quality: NM Environment Dept - Ground Water Quality Bureau (discharge permits for domestic waste over 2,000 gpd and all other waste types) - Liquid Waste Program (discharge permits for the reuse of residential and commercial domestic waste under 2,000 gpd) - Drinking Water Bureau (oversight of public water supplies that develop indirect and direct potable reuse projects) - NM Regulations And Licensing Dept, Construction Industries Division (Design And Construction) Quantity: Office of the State Engineer & Interstate Stream Commission
ND	Reuse: water that has been diverted from its original natural source for a specific beneficial use and used for that purpose, then subsequently reused prior to its discharge back into the natural system	Yes	No specific statutes	ND regulates reuse through its North Dakota Pollution Discharge Elimination System program	"North Dakota State Engineer Policy/Procedure for Transfer and Reuse of wastewater," https://www.swc.nd.gov/pdfs/wastewater_policy.pdf Available on request: "Guidelines For Using Treated Wastewater In Construction" "Criteria For Irrigation With Treated Wastewater"	Quality: ND Dept. of Environmental Quality Quantity: Office of the State Engineer

OK	Reclaimed water: wastewater that has gone through various treatment processes to meet specific water quality criteria with the intent of being used in a beneficial manner.	Yes	Okla Stat. §§ 82-1088.11-.14 (Water for 2060 Act)	Operation and Maintenance of Water Reuse Systems: Okla. Admin. Code Title 252 Ch. 627 Indirect Potable Reuse for Surface Water Augmentation: OAC Title 252 Ch. 628 Water Pollution Control Facility Construction Standards: OAC Title 252 Ch. 656 Water Quality Standards: OAC Title 785 Ch. 45	Water for 2060 and the Oklahoma Comprehensive Water Plan, both available at http://www.owrb.ok.gov/ocwp/index.php Water Reuse Implementation in Oklahoma, http://www.owrb.ok.gov/2060/pdf/WaterReuseImplementation-DEQ.pdf	Quality: OK Dept. of Environmental Quality Quantity and Planning: OK Water Resources Board
OR	Recycled water: treated effluent from a municipal wastewater treatment system which as a result of treatment is suitable for a direct beneficial purpose; Reclaimed water: water that has been used for municipal purposes, has been treated in a sewage treatment system, and is suitable for a direct beneficial purpose or a controlled use that could not otherwise occur.	Yes	Or. Rev. Stat §§ 537.131 – 132 (Reclaimed water) ORS § 468b.015 (Oregon Water Policy) ORS § 215.213 (use of reclaimed water in exclusive farm zones)	Recycled Water Use: Or. Admin Rules Ch. 340-055-0005 – 0030 Water Management and Conservation Plans: OAR 690-086-0010 – 0920	Executive Order 05 – 04, encouraging reuse: https://www.oregon.gov/gov/Documents/executive_orders/EO0504.pdf 2009 Internal Management Directive: Implementing Oregon's Recycled Water Rules, https://www.oregon.gov/deq/Filtered%20Library/RecycledWater.pdf 2001 Land Application Laws and DEQ's Procedures for Proposals to Land Apply on EFU Lands, https://www.oregon.gov/deq/FilterDocs/landappllawsefu.pdf MOU defining agency reuse responsibilities: https://www.oregon.gov/deq/FilterPermitsDocs/Reusemou.pdf Urban water reuse task force report: https://www.oregon.gov/deq/FilterPermitsDocs/sb820report.pdf Case law: Water right holders may recapture wastewater, remaining on his/her land, and	Quality: OR Dept. of Environmental Quality Quantity: OR Water Resources Dept. CAFOS: OR Dept. of Agriculture Public Health: Oregon Health Authority

					reapply that water to the original beneficial use in the location authorized under the water right without any additional authorizations. The courts have also ruled that organizations such as irrigation districts or municipalities may capture waste or seepage water before it enters a natural waterway and before it leaves the boundaries of the district.	
SD	No formal definition	No	No specific laws	SD regulates land application of treated municipal and domestic wastewater via NPDES permits; industrial wastewater through its wastewater management program; and uses a general permit to regulate CAFO reuse under its Surface Water Discharge Program Wastewater treatment works: SD Admin Rules 74:05:08:01 NPDES Permits: SDAR 74 :52 Effluent standards: 40 CFR Subchapter N	Design criteria for the reuse of treated domestic wastewater, http://denr.sd.gov/documents/designnumber.pdf. Op. Attorney Gen. S.D. 75-177, 1 (1975) - Reasoned that land application of wastewater by a municipality is valid under the original appropriation and does not require an additional permit to irrigate, provided that the water is used for municipal purposes and the use does not affect downstream prior appropriators	Quality/Quantity: SD Dept. of Environment and Natural Resources
TX	Reclaimed water, produced through direct or indirect reuse. Direct reuse: the use of wastewater effluent that has been directly conveyed from the wastewater treatment plant to the place of use via infrastructure. Indirect use: water that is discharged into a watercourse and subsequently re-	No – reuse is a type of authorization, not a beneficial use	Tex. Water Code § 11.042 & § 11.046 (Water rights related to reuse) TWC § 11.121 (Groundwater return flows) TWC § 26.0311 (Standards for Control of Graywater) Tex. Health & Safety Code § 341.039 (Graywater and Alternative Onsite Water standards) THSC § 366 (Onsite Sewage Disposal Systems)	Use of Reclaimed Water: 30 TAC Ch. 210 Reclaimed Water Production Facilities: 30 TAC Ch 321, Subchapter P Water Quality Standards: 30 TAC Ch. 290 Other related regulations: 30 TAC Ch. 295 30 TAC Ch. 297 Direct reuse authorized either through individual authorizations or by rule.	Texas State Water Plan, www.texasstatewaterplan.org/statewide Direct Potable Reuse Monitoring, https://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1348321632_vol1.pdf Direct Potable Reuse Resource Document, https://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1248321508_Vol1.pdf	Quality and Quantity: Texas Commission on Environmental Quality (TCEQ) Underground Injection Wells, including aquifer recharge, aquifer storage and recovery, and subsurface fluid distribution systems: Railroad Commission of Texas & TCEQ

	diverted for a beneficial purpose.				History of Water Reuse in Texas, https://www.twdb.texas.gov/innovativewater/reuse/projects/reuseadvance/doc/component_a_final.pdf Water Reuse Research Agenda, https://www.twdb.texas.gov/innovativewater/reuse/projects/reuseadvance/doc/component_c_final.pdf	
UT	Reuse water: Domestic wastewater treated to a standard acceptable under rules made by the Water Quality Board	Yes, but use must be in line with the underlying water right	Utah Code Ann. §§ 73-3c-101 – 401 (Wastewater Reuse Act) UCA §§ 19-5-101 – 124 (Water Quality Act)	Effluent criteria for land application: Utah Admin. Code § R317-3-11 Use of Industrial Wastewaters: UAC § R317-1-5 Approvals and Permits for a Water Reuse Project: UAC § R317-13 Approval of Change in Point of Discharge of POTW: UAC § R317-14	Major overhaul to Utah State Water Plan expected 2020 Water Reuse in Utah, https://gomb.utah.gov/wp-content/uploads/2019/04/Water-Reuse-in-Utah-Water-Resources-2005.pdf	Quality: UT Division of Water Quality Quantity: UT Division of Water Rights Quantity/Planning: UT Division of Water Resources IPR/DPR: UT Division of Drinking Water
WA	Reclaimed water: water derived in part for wastewater with a domestic component that has been adequately and reliably treated	Yes	Wash. Rev. Code § 90.46 (Reclaimed Water Use) RCW § 90.03 (WA Water Code) RCW § 90.44 (Groundwater) RCW § 90.48 (Water Pollution Control) RCW § 90.22 & § 90.54 (Water resources/Instream flows) RCW § 70.118A-B (Onsite Sewage Treatment)	Reclaimed Water: Wash. Admin Code Ch. 173-219 Water quality standards: WAC Ch. 173-201A Groundwater quality standards: WAC Ch. 173-200 Other related regulations: WAC Ch. 246-290-310 WAC Ch. 246-290-135	Reclaimed Water Facilities Manual, https://fortress.wa.gov/ecy/publications/SummaryPages/1510024.html	Quantity and Quality: WA Dept. of Ecology Public Health: WA Dept of Health
WY	Treated wastewater: domestic sewage discharged from a	Yes	Wyo. Stat. Ann. § 35-11-101 (Wyoming Environmental Quality Act)	Water reuse standards: 020 Wyo. Admin. Rules Ch. 11 §§ 71-87	*Thayer v. Rawlins*, 594 p.2d 951 (Wyo. 1979) - holding that the principle that an appropriator is	Quality and Public Health: WY Dept. of Environmental Quality

	treatment works after completion of the treatment process		WSA § 35-11-301 (Prohibitions)	Surface water quality standards: 020 WAR Ch.1 Permits for treated wastewater reuse systems 020 WAR Ch. 3	continually entitled to the flow of the stream as it existed at the time of appropriation did not apply to introduced water brought in from an outside (trans-basin) source. Case also clarified that a water user who adds water to the natural flow of a stream is entitled to take that same "imported" water back out to use, even though a senior priority on the same stream may be left without water as a result	Water Rights: State Engineer

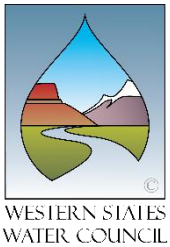
OVERVIEW OF STATE REUSE CATEGORIES AND TREATMENT STANDARDS

State	Categories of Reuse	Reuse Water Quality Standards	Treatment Methods & Monitoring	Source
AK	NA	NA	NA	NA
AZ	A+: Potable water A: Suitable for uses that have high possibility of human exposure B+: Suitable for uses that have moderate possibility of human exposure B: Suitable for uses that have moderate possibility of human exposure C: Suitable for uses with little possibility of human exposure	Minimum: Fecal coliform Higher quality water includes standards for: Nitrogen Enteric viruses Turbidity	Dictated within the permit	AAC R18-11-301-309
CA	The State Water Board and Regional Water Boards set water quality standards that vary across the state. This 2016 General Order from the State Water Board regulates non-potable reuse based on the California Water Code.	Non-potable reuse: Priority pollutants Total Coliform Turbidity	Application requires complete description of water recycling program, including monitoring and reporting requirements	2016 General Order: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2016/wqo2016_0068_ddw.pdf
CO	Category 1: No possibility of public exposure Category 2: Medium chance of public exposure Category 3: High chance of public exposure	Finished Water parameters: E. coli Turbidity Total Suspended Solids (TSS) Secondary treatment: Biochemical Oxygen Demand (BOD) TSS	There are no specific disinfection requirements, but all reclaimed water projects "should include frequent determinations and record-keeping to assure that disinfection is being provided prior to use."	Monitoring and Reporting Requirements for Reclaimed Water Treatment Facilities, available at https://www.colorado.gov/pacific/cdphe/wq-reclaimed-water-reuse-permits
ID	Five classes of municipal water: A, B, C, D, E (with increasing use restrictions the lower the class)	Pathogens: identical to CA Title 22 standards for disinfection Total Coliform: treatment and disinfection depends on class 5-day BOD and nitrogen limits required for Class A; Classes B-E addressed on case-by-case basis Salt loading limits addressed on case-by-case basis	Uses EPA's requirements for pathogen and contaminant testing methods (40 CFR 136)	IDAPA 58.01.17

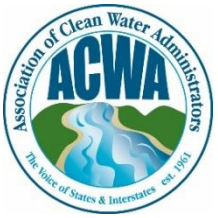
		Unregulated contaminants not evaluated		
KS	NA	NA	Disinfection and monitoring typically required.	-
MT	Reclaimed wastewater only allowed to be used for irrigation, according to class: Class A: All spray and drip irrigation of food and nonfood crops allowed; both restricted and nonrestricted access areas for landscape irrigation allowed Class B: All spray and drip irrigation allowed except for root crops; landscape irrigation only allowed for restricted access areas Class C: Spray and drip irrigation of nonfood crops and only spray irrigation of food crops allowed; landscape irrigation only allowed for restricted access areas Class D: Only spray irrigation of trees and fodder, fiber and seed crops and drip irrigation of trees allowed	Buffer zones required for Classes B, C, and D reclaimed wastewater Minimum requirements (Class D): wastewater must be settled and oxidized Classes A-C require specific levels of: BOD5 Turbidity Total coliform	Minimum monitoring is monthly total nitrogen analysis for Class D. Classes A-C require weekly and monthly monitoring depending on monitored value.	Circular DEQ-2 Table 121-1 and Table 121-2
NE	NA	NA	Disinfection and monitoring typically required	-
NV	Category A+: Indirect potable reuse and all other uses Category A: Public access is unrestricted and human contact reasonably expected to occur Category B: Public access is restricted and human contact cannot reasonably be expected to occur Category C: Public access is restricted and human contact does not occur Category D: Public access is prohibited and human contact does not occur Category E: Spray irrigation only if public access is prohibited and a buffer zone of at least 800 ft is maintained	All reuse water: 5-day inhibited BOD TSS pH Total Coliform Fecal Coliform For A+ water: Provisions of the "National Primary Drink Water Regulations" and related federal regulations adopted by reference in NAC 445A.4525 Secondary MCLs specified in NAC 445A.455 12-log enteric virus reduction 10-log *Giardia lamblia* cyst reduction 10-log *Cryptosporidium* oocyst reduction	Project must have a reclaimed water management plan, site specific management plan, and discharge permit, which include monitoring requirements.	NAC 445A.275-276
NM	Class 1A: acceptable for direct consumption Class 1B: for uses in which public exposure is likely Class 2: for uses in which public access and exposure is limited	BODs TSS Fecal Coliform Treatment related capacity or UV transmissivity	Monitoring required for reused water. Frequency depends on the class of reclaimed water.	"Above Ground Use of Reclaimed Domestic Wastewater" (Reuse Guidance) available at https://www.env.nm.gov/gwqb/gw-regulations/

	Class 3: for uses in which public access and exposure is prohibited	Pathogens only addressed through requirements for disinfection for reuse Calculated residence time could be required on case-by-case basis		
ND	NA	NA	NA	NA
OK	Indirect potable reuse Category 2: spray and drip irrigation, toilets, fire, closed loop AC, vehicle washing, cattle watering, water for oil and gas, Cat 3/4/5 Category 3: subsurface irrigation for orchards, livestock, hydraulic fracturing, dust control, some construction, Cat 4/5 Category 4: restricted access golf course irrigation, soil compaction and similar construction, Cat 5 Category 5: restricted access irrigation Category 6: no permit req'd; only used within wastewater treatment plant	All reuse water: Fecal coliform Chlorine Turbidity Add'l for IPR water: BOD5 pH Total Organic Carbon TSS	Disinfection depends on category; Cat 2/3 require secondary treatment; Cat 4/5 requires primary treatment. Monitoring for IPR: Flow and turbidity: continuously Disinfection byproducts: 2x/mo Nutrients: weekly (May-Oct), and 2x/mo (Nov-Apr) Pesticides: monthly Radionuclides: every 5 years	OAC 252:627, 628, 656
OR	Class A: Allowed to be used for all types of irrigation use, industrial, commercial or construction use, and for impoundments or artificial groundwater recharge Class B: Allowed for most irrigation uses except for food crops or landscape irrigation; most industrial uses except car washes and fountains; landscape and restricted recreational impoundments Class C: Allowed for most irrigation uses except for food crops or landscape irrigation; most industrial uses except car washes, fountains, fire suppression and toilets; landscape impoundments Class D: Irrigation of nonfood crops, trees, sod, animal pasture Non-disinfected	All water must be oxidized and disinfected. Classes A-D have various requirements of: Turbidity, Total coliform and/or *E. coli*	Recycled Water Use Plan required; must describe how the wastewater treatment system owner will comply with the rules. At minimum, a NPDES or State Water Pollution Control Facility permit is required to set monitoring requirements. Classes A-D have specific monitoring requirements depending on monitored value.	OAR 340-055
SD	NA	NA	NA	NA
TX	Direct potable reuse permitted on case-by-case basis Type I Reclaimed Water: Public may come into contact with water Type II Reclaimed Water: Public will not come into contact with water	Minimum standards: 2-log removal *Cryptosporidium* oocysts 3-log removal or inactivation of *Giardia* oocysts 4-log removal or inactivation of viruses Additional treatment possible for sources of poorer quality water	Type I Reclaimed Water must be sampled 2x per week. Type I Reclaimed Water must be sampled 1x per week. Monitored values are reported on a 30-day average.	30 TAC 210, 30 TAC 290.42

		Type I and Type II Reclaimed Water must meet specific levels of each of the following: BOD/CBOD Turbidity Fecal coliform or *E. coli* *Enterococci*		
UT	Type I: Human exposure likely Type II: Human exposure unlikely	BOD Total suspended solids Turbidity Disinfection E.coli Total residual chlorine pH	Monthly, weekly, daily and/or continuous sampling required depending on monitored value.	UAC R317-3-11
WA	Class A+: Direct potable reuse Class A: Potential for direct public contact Class B: No potential for direct public contact	Minimum standards: Dissolved oxygen BOD5 CBOD5 TSS pH pH (groundwater discharge) Class A/B also have standards for: Turbidity Total Coliform Virus removal Total nitrogen	Standards have monthly, weekly and/or averages of maximums or minimums (depending on monitored value) that must be met. Permits can include a detailed self-monitoring and testing schedule for water quality limits or other parameters required to demonstrate reclaimed water is protective of human health and environment.	WAC 173-219-330, WAC 173-219-260
WY	Class A Wastewater: irrigation of land with high potential for public exposure or direct/indirect consumption food crops Class B Wastewater: irrigation of land with moderate level for public exposure and direct/indirect consumption food crops Class C Wastewater: irrigation of land with a low potential for public exposure and indirect consumption food crops	Fecal coliform Nitrate Ammonia pH For industrial and produced water reuse, other parameters as required by permit.	At minimum, a WYPDES or State Water Pollution Control permit is required. Advanced/secondary treatment required for Class A. Secondary treatment required for Class B. Primary treatment required for Class C. Advanced treatment may be required for land application of industrial wastewater and produced water. Permits can include a detailed monitoring and testing schedule to demonstrate reclaimed water is protective of human health and environment.	WAR 020 Ch. 11 §§ 71-87



State Water Reuse Governance and Programs
WSWC & ACWA Survey 2020



This joint WSWC-ACWA survey is an effort to better understand the current status of water reuse from a state-level perspective. Our states have expressed an interest in learning from each other, as there are many different ways to approach water reuse. WSWC would like to update information from its 2011 survey report. This will both provide up-to-date details as well as enable states to evaluate what has changed over the last decade. As such, ACWA is partnering with WSWC to help advance state clean water programs' ability to address or implement water reuse and work towards their related clean water goals. As there is considerable overlap in the membership of our organizations, our members felt it would consume fewer resources to carry out a joint survey.

Please distribute the survey to your relevant agencies and return responses to WSWC or ACWA no later than April 30, 2020. Please feel free to include links to any information available online as appropriate.

Regulations and Standards

1. *Defining Reuse*: How does your state define water reuse and what types of water reuse are proposed/recognized/permitted, e.g. municipal, agricultural, industrial, oil and gas, etc., for potable and non-potable water?
2. *Governing Reuse*: (a) Please list any state statutes, regulations, guidance or other policies that govern (enable, encourage, or restrict) water reuse. (b) Please identify any federal statutes or regulations that inhibit water reuse and how those might be amended or rewritten. (c) Are there any aspects of water reuse that are unregulated?
3. *Water Supply*: (a) How does your state address or deal with water rights related to water reuse? (b) Does your state recognize water reuse as a "beneficial use"? (c) Who may retain/obtain a reuse water right and through what process?
4. *Water Quality*: (a) How does your state address potential organic contaminants, viral pathogens, chlorides, and other contaminants in reclaimed water for potable/non-potable reuse? (b) Has your state needed to align/adjust any policies or laws on drinking water and wastewater to enable potable reuse?
5. *Water Quality-Quantity Nexus*: (a) How is water reuse a part of any integrated state water plan or other planning process? (b) Has your state encountered tension between policies and laws governing water quality and water supply involving water reuse? (c) If so, how have you worked toward resolving those?

6. *Reuse Resources*: (a) Does your state work with other states, federal agencies, or non-governmental entities in developing reuse criteria and requirements? (b) How might your state benefit from interstate or federal guidance or financial/technical support related to water reuse? (c) Would you be willing to be a resource and share your experiences with other states?

Programs, Funding, and Projects

7. (a) What state agencies, departments, or other entities have jurisdiction or responsibilities over water reuse programs? (b) How many FTE staff are dedicated or partially dedicated to water reuse?
8. (a) Does the state provide financial assistance (e.g., grants, loans) for water reuse projects or activities? (b) If so, what are the eligibility criteria and what amounts are typically available?
9. (a) How does your state promote public outreach to encourage or alleviate fears/concerns about water reuse? (b) What are the greatest obstacles to public acceptance?
10. (a) Has your state experienced any negative (or positive) environmental, social, political, fiscal, or water resource effects from water reuse activities? (b) Are there other factors that inhibit or encourage water reuse?
11. Are there any considerations, factors, or concerns your state is working on that have not been raised by these questions?
12. Please provide a brief summary of the number and types of water reuse projects in your state. If your state maintains an inventory of water reuse projects, please provide a link or a copy.

Type of Reuse	Estimated # Projects in Operation	Annual Production Amount Permitted	# Projects Considered but Not Approved	# Projects Started but Ceased Operations